



Owner's Manual





DEFENDER 90

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Introduction

PASSPORT TO SERVICE

The Passport to Service included in your literature pack, contains important vehicle identification information, details of your entitlement under the terms of the Land Rover warranty, as well as useful consumer advice.

Most important of all, however, is the section on maintenance. This outlines the servicing requirements for your vehicle, as well as incorporating the service record slips, which the dealer should sign and stamp to certify that routine services have been carried out at the recommended intervals.

WARNING

Safety warnings are included in this handbook. These indicate either a procedure which must be followed precisely, or information that should be considered with great care in order to avoid the possibility of personal injury or serious damage to the vehicle.

WARNING LABELS ATTACHED TO THE VEHICLE



Warning labels attached to your vehicle bearing this symbol mean: **DO NOT touch or adjust components until you have read the relevant instructions in the handbook.**



Warning labels showing this symbol indicate that the ignition system utilises very high voltages. **DO NOT touch any ignition components while the starter switch is turned on!**

WARNING

Your vehicle has a higher ground clearance and, therefore, a higher centre of gravity than ordinary passenger cars. This will result in different handling characteristics. Inexperienced drivers should take additional care, particularly in off-road driving situations and when performing abrupt manoeuvres on unstable surfaces.

Introduction

VEHICLE IDENTIFICATION NUMBER (VIN)

If you need to communicate with a Land Rover dealer, you may be asked to quote the Vehicle Identification Number (VIN).

The VIN and other information concerning the vehicle, can be found on a plate, located in the driver's footwell (this should also match the VIN recorded in the Passport to Service).

In addition, the Federal VIN plate is mounted to the vehicle body, in such a position that it is visible from the outside, through the bottom corner of the windscreen on the driver's side.

ANTI-THEFT PRECAUTIONS

While it may be difficult to deter the 'professional' car thief, the majority of thefts are carried out by unskilled opportunists. Therefore, take vehicle security very seriously and ALWAYS adopt this simple 'five point' drill whenever you leave your vehicle - even for just a few minutes:

- Fully close all the windows and the sunroof (if fitted).
- Remove your valuable belongings (or hide them out of sight).
- Remove the starter key.
- Engage the steering lock (by slightly turning the wheel until it locks).
- Lock all the doors.

Thieves are attracted to 'vulnerable' vehicles. Even if you have followed the 'five point' drill, there is still much you can do to make your vehicle a less inviting target.

BE SAFE NOT SORRY!

- Park where your vehicle can easily be seen by householders and passers-by.
- At night, park in well lit areas and avoid deserted or dimly lit side streets.
- At home, if you have a garage, use it - and NEVER leave the keys in the vehicle.
- Do not keep important vehicle documents (or spare keys) in the vehicle - these are a real bonus for the thief.

IMPORTANT INFORMATION

Remember the breakdown safety code

If a breakdown occurs while travelling:-

- Wherever possible, consistent with road safety and traffic conditions, the vehicle should be moved off the main thoroughfare. If a breakdown occurs on a freeway, pull well over to the inside of the hard shoulder.
- Switch on hazard lights.
- If possible, position a warning triangle or a flashing amber light at an appropriate distance from the vehicle to warn other traffic of the breakdown (note the legal requirements of some areas in this respect).
- Consider evacuating passengers through the right hand doors away from the road as a precaution in case your Defender is struck by another vehicle.

SECTION 2

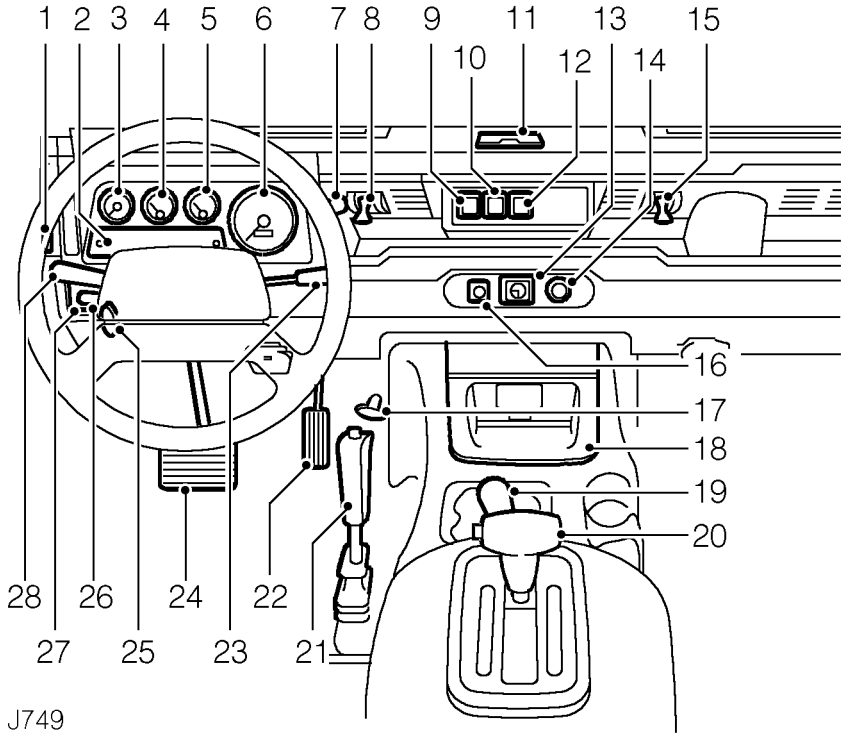
Controls & instruments

In this section of the handbook you will find descriptions of the controls and instruments on your vehicle.

For your own safety, it is most important to read this section fully and to gain a thorough understanding of all the controls before driving.

Section Contents	Page
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Controls



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- | | |
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| 1. Heating & ventilation controls | 15. Ventilator control |
| 2. Warning lights | 16. Hazard warning light switch |
| 3. Tachometer | 17. Hood release handle |
| 4. Temperature gauge | 18. Fuse box cover |
| 5. Fuel gauge | 19. Transfer gear lever |
| 6. Speedometer | 20. Main gearchange lever |
| 7. Heater fan control | 21. Parking brake lever |
| 8. Ventilator control | 22. Accelerator pedal |
| 9. Rear screen heater switch | 23. Windscreen wash/wipe control |
| 10. Rear screen wiper switch | 24. Brake pedal |
| 11. Ashtray | 25. Starter switch and steering lock |
| 12. Rear screen washer switch | 26. Lighting switch |
| 13. Clock | 27. Instrument illumination switch |
| 14. Cigar lighter | 28. Lighting, direction indicator & horn switch |

Door locks



D004A

KEYS

You have been supplied with two sets of keys, comprising:

- a black key for operating the starter switch.
- a plain metal key for operating the door locks.
- a grey key for operating the cubby box lock.

Key numbers

The starter key and glovebox key numbers are stamped on a tag attached to their respective key rings. The door lock key number is stamped on the key itself. All key numbers should be entered on the Security Information card.

WARNING

Keep the spare keys and key tags in a safe place - NOT IN THE VEHICLE!

Ensure the key numbers are recorded on the Security Card supplied with your literature pack - DO NOT KEEP THE CARD IN THE VEHICLE!

Front doors

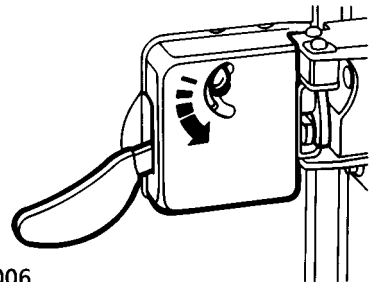
From outside the vehicle, turn the key towards the rear of the vehicle to lock and towards the front to unlock.

Door sill locking buttons

From inside the vehicle, each door can be individually locked, by depressing the appropriate sill locking button.

WARNING

DO NOT depress the sill buttons as a means of locking the doors from outside the vehicle (this practice - known as 'slam locking' - is not recommended, because keys can be locked inside accidentally).



D006

Taildoor

From outside, use the key to lock and unlock. From inside and with the door closed, push the locking button up to lock and down to unlock (as illustration).

FRONT SEAT ADJUSTMENT

WARNING

To avoid the risk of loss of control and personal injury, never adjust the driver's seat or seatback while the vehicle is in motion.

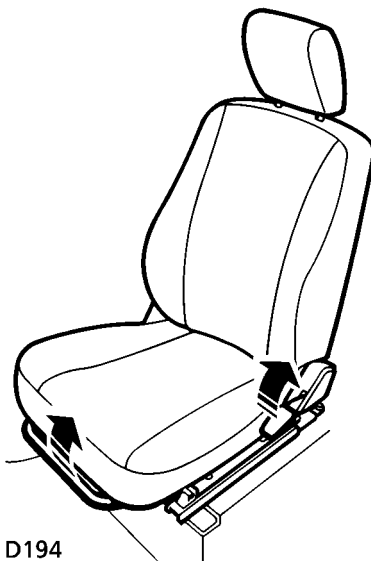
DO NOT allow occupants to travel with the seat backs reclined steeply rearwards. Optimum benefit is achieved from the seat belt, with the seat back angle set to 15 degrees from the vertical (upright) position.

Forward/backward movement

Lift the bar at the front of the seat base to slide the seat forward or back. Ensure the seat is locked in position before driving.

Backrest movement

Lift the lever and lean backwards or forwards to achieve the desired angle, then lower the lever to lock.



D194

Seats

Rear seats - (Station wagons)

Station wagon models are fitted with inward facing rear seats, which can be folded away when not in use.

To erect the seats, release the strap securing the seatbase, pull out the seat stand and fold down the seatbase, ensuring that the seat stand locates where the vehicle floor meets the wheel arch (see illustration).

NOTE: Soft top vehicles can be fitted with forward facing rear seats, provided that a full Safari roll cage has been installed.

WARNING

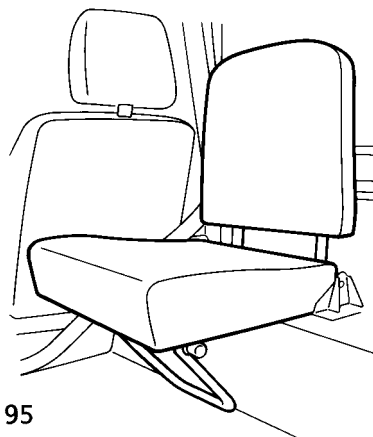
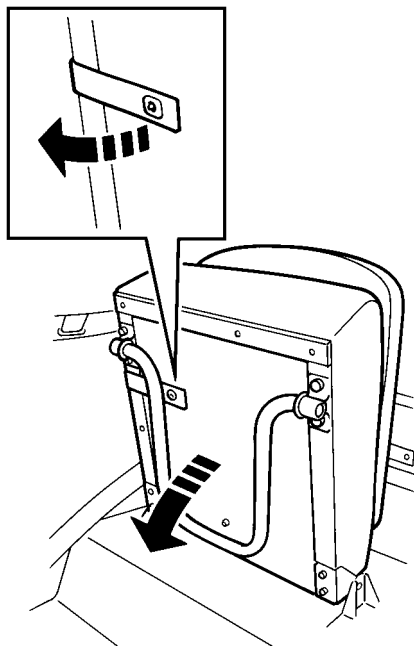
DO NOT adjust the seats or seat stands while the vehicle is in motion.

When the seat is erected, the seat stand should be visually checked and physically tested, to ensure that the seatbase is secure before driving.

DO NOT allow the rear seats to be used unless the seat stand is in the correct position.

Ensure that rear seat passengers wear seat belts at all times.

DO NOT carry passengers in the rear of the vehicle unless rear seats are fitted.



D195

Seat belts

SEAT BELT SAFETY

Seat belts are life saving equipment.

In a collision, unrestrained passengers can be thrown around inside the vehicle, or possibly thrown out of the vehicle, resulting in injury to themselves and to other occupants. DO NOT take chances with safety!

- DO make sure ALL passengers are securely strapped in at all times - even for the shortest journeys.
- ALWAYS adjust seat belts to eliminate any slack in the webbing, and to ensure that the diagonal belt passes across the shoulder without slipping off or pressing on the neck.
- ALWAYS fit the lap strap as low on the hips as possible (never across the abdomen).
- DO NOT slacken the webbing by pulling the belt away from the body - to be fully effective, the seat belt must be in full contact with the body at all times.
- DO have seat belts checked if the vehicle has been involved in an accident.
- DO NOT allow front seat occupants to travel with the seat backs reclined steeply rearwards. Optimum benefit is obtained from the seat belt, with the seat back angle set to 15 degrees from the upright (vertical) position.

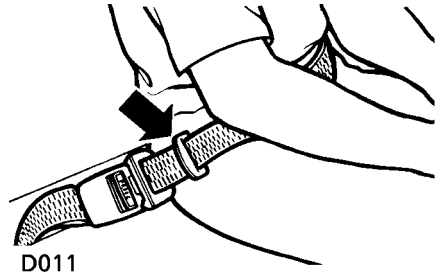
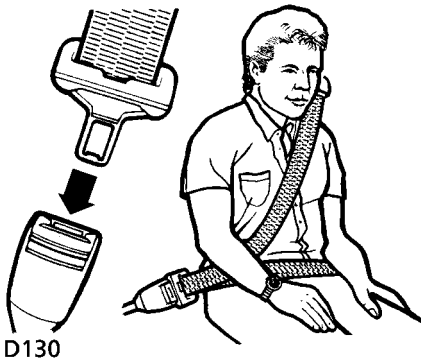
- DO use the seat belts to secure large items of luggage that are to be carried on the seats - in the event of an accident, insecure items become flying missiles capable of causing serious injury.
- DO NOT fit more than one person into a belt, or fit a seat belt that is twisted or obstructed in any way that could impede its smooth operation.
- DO NOT allow foreign matter (particularly sugary food and drink particles) to enter the seat belt locks - such substances can render the locks inoperative.

WARNING

Pregnant women should ask a doctor for advice about the safest way to wear seat belts.

Ensure that all seat belts are worn correctly - an improperly worn seat belt increases the risk of death or serious injury in the event of an accident.

Seat belts



WARNING

At all times, occupants should wear a seat belt for their protection in the event of a collision or sudden stop. In some circumstances, perhaps due to the vehicle being on a slope, the automatic locking mechanism may engage, preventing the initial extension of the belt. This is not a fault - ease the belt free and use it.

Lap belts

To adjust, pull the slider along the belt and feed the webbing through the buckle until the belt is comfortably tight. When not in use, the lap belts should be stowed behind the seat back.

Fastening the inertia reel belts

Draw the belt over the shoulder and across the chest, and insert the metal tongue plate into the lock nearest the wearer - a 'click' indicates that the belt is securely locked.

Seat belts are designed to bear upon the bony structure of the body (pelvis, chest and shoulders) and can only be worn safely with the webbing crossing the shoulder MIDWAY BETWEEN THE NECK AND THE EDGE OF THE SHOULDER and with the seats in a normal UPRIGHT position - DO NOT allow the front passenger to travel with the seat steeply reclined.

Seat belts

Infant and child restraints

All infant and child restraint systems are designed to be secured in forward facing vehicle seats by means of a lap belt or the lap portion of a lap/shoulder belt.

When installing and using any infant or child restraint system, always follow the instructions provided by the manufacturer concerning installation and use. Failure to properly secure the child restraint system in the vehicle can endanger the child in a collision or sudden stop and cause injury to other passengers.

The front passenger seat belt is fitted with a retracting lock mechanism, providing extra security for a child restraint in the event of an accident. To activate the passenger seat belt lock mechanism, pull the seat belt out to its full extent and then allow it to retract until it is the correct length to secure the child seat. The seat belt will now be locked in that position until released by undoing the seat belt in the normal way.

Never leave a child unattended in your vehicle.

WARNING

Infants and children too small for seat belts should be restrained in a child safety seat or restraint system, appropriate to their age and/or size, and which is approved for use in your vehicle. Always ensure that the manufacturer's fitting instructions are followed exactly.

- *Do not fit child safety seats or restraint systems to the inward facing rear seats.*
-

Seat belts

Caring for seat belts

Regularly inspect the belt webbing for signs of wear, paying particular attention to the fixing points and adjusters. Always replace a seat belt that has withstood the strain of an impact or shows signs of fraying.

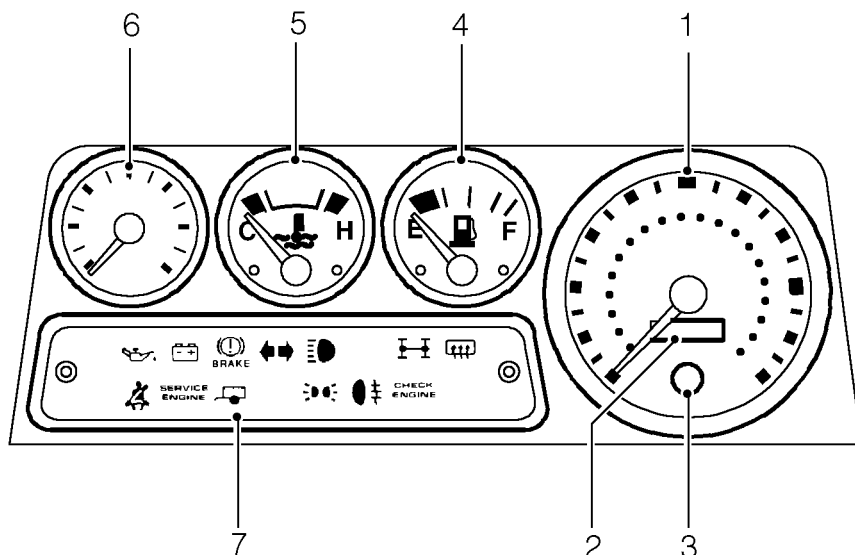
DO NOT bleach or dye the webbing. Clean the webbing using warm water and non-detergent soap only - allow to dry naturally and DO NOT retract the belt until completely dry.

Testing inertia reel belts

From time to time carry out the following tests:

1. With the seat belt fastened, give the webbing near the buckle a quick upward pull. The buckle must remain securely locked.
2. With the seat belt unfastened, unreel the webbing to the limit of its travel. Check that unreeling is free from snatches and snags.
3. With the webbing half unreeled, hold the tongue plate and give it a quick forward pull. The safety mechanism must lock automatically and prevent any further unreeling.

Instruments



J750

1. Speedometer

Indicates road speed in miles and/or kilometres per hour.

2. Odometer and trip odometer

Indicates the total distance or the individual journey distance travelled by the vehicle - press and release the reset button (3) to change between the two.

3. Odometer and trip odometer mode/reset button

Press and release the mode button to change the digital display between either the total distance the vehicle has travelled, or the individual journey distance. Press and hold the button to reset the trip odometer to zero.

4. Fuel gauge

The pointer indicates the fuel level when the starter switch is turned to position 'II'.

5. Temperature gauge

Once the engine coolant has reached its normal operating temperature, the pointer should remain between the 'C' (cold) and 'H' (hot) segments. If the pointer enters the 'H' segment, stop the vehicle as soon as safety permits and seek qualified assistance before continuing.

6. Tachometer

Indicates engine speed in revolutions per minute (rev/min). In normal driving conditions, the engine speed should NEVER exceed 5500 rev/min.

7. Warning light pack

For a full explanation of the function of the warning lights, see 'Warning lights'.

Warning lights

WARNING LIGHTS

The specification of the warning lights will vary according to model and market requirements.

The warning lights are colour coded as follows:

RED lights are warnings.

WARNING

DO NOT drive if a RED warning light remains on once the engine is running or illuminates whilst driving.

GREEN & BLUE lights indicate that a unit is operating.

AMBER lights show that a unit is operating and should be switched off (or rectified) as soon as conditions allow.



Low engine oil pressure - RED

Illuminates as a bulb check when the starter switch is turned to

position 'II' and extinguishes when the engine is running. If it remains on, or illuminates whilst driving, STOP THE VEHICLE as soon as safety permits and seek qualified assistance before continuing. Always check oil levels when this light illuminates.

NOTE: At very low ambient temperatures, the light may take several seconds to extinguish.



Battery charging - RED

Illuminates as a bulb check when the starter switch is turned to position 'II' and extinguishes when the engine is running. If it remains on, or illuminates whilst driving, a fault is indicated. Seek qualified assistance urgently.



Brake system check - RED

Illuminates as a bulb check when the starter switch is turned to position 'II' and extinguishes when the engine is running and the parking brake is released. If it remains on, or illuminates whilst driving, a fault with the braking system is indicated. STOP THE VEHICLE as soon as safety permits and seek qualified assistance before continuing.

WARNING

DO NOT drive the vehicle while the brake warning light is illuminated.



Direction indicators - GREEN

Flashes in conjunction with the direction indicators. If the light does not illuminate, this may indicate a bulb failure in the warning light pack or in one of the direction indicator lights.



Headlight high beam - BLUE

Illuminates whenever the high beam headlights are on.

Warning lights



Differential lock - AMBER

Illuminates whenever the differential lock is engaged.

If the light remains on after the differential lock is disengaged, transmission 'wind up' may be present. Reversing for a short distance and then going forward will usually 'unwind' the transmission. If the light remains on, contact your dealer as soon as possible.



Heated rear screen - AMBER (if fitted)

Illuminates when the rear screen heater is operating.



Seat belt warning - RED

If the driver's seat belt is not fastened, the light illuminates when the starter switch is turned to position 'II'. The light extinguishes as soon as the driver's seat belt is fastened. ALWAYS fasten your seat belt BEFORE driving!



Emission maintenance reminder - RED

Illuminates as a bulb check when the starter switch is turned to position 'II'. If the light illuminates at any other time, the vehicle should be taken to your Land Rover dealer for a special emission related service to be carried out.



Trailer direction indicators - GREEN

Flashes in conjunction with the vehicle direction indicator lights to show that all trailer indicator lights are functioning correctly. In the event of a bulb failure on the trailer, the warning light flashes once and then remains off.



Side lights - GREEN

Illuminates whenever the side lights are on.



Check engine - AMBER

Illuminates momentarily as a bulb check when the starter switch is turned to position 'II' and should extinguish when the engine is running. Illumination at any other time, indicates an engine fault - if the light flashes, reduce speed and seek qualified assistance urgently.

IMPORTANT INFORMATION

AUDIBLE WARNINGS

Driver's seat belt reminder

A chime will sound for up to 8 seconds, if the starter switch is turned to position 'II', when the driver's seat belt is unfastened.

Starter key warning

A chime will sound if the key is left in the starter switch, with the switch in position 'I' or 'O', when the driver's door is opened.

Lights on warning

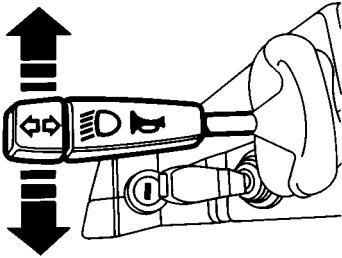
A chime will sound if the lights are left on when a front door is opened.

Transfer box warning

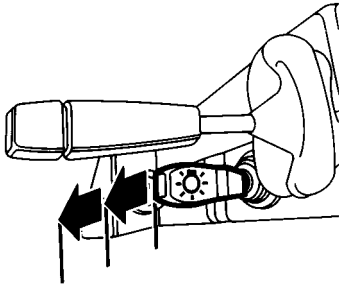
A warning chime will sound whenever the transfer box gear lever is in the neutral position.

NOTE: When a trailer is not fitted, the warning light will only flash once.

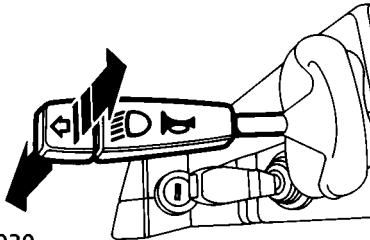
Lights & indicators



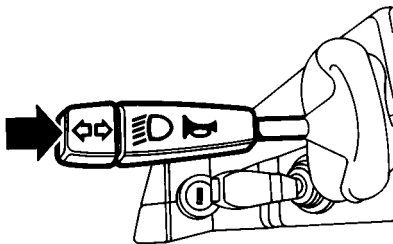
D028



D029



D030



D031

Direction indicators

Move the lever **DOWN** to indicate a **LEFT** turn, and **UP** to indicate a **RIGHT** turn (the **GREEN** warning light on the instrument panel will flash in time with the direction indicators). Hold the lever part-way up or down against spring pressure to indicate a lane change.

Main light switch

Lever position;

- Static - all lights off
- First position - parking, tail and instrument panel lights on
- Second position - headlights on

Headlight high beam and 'flash'

With the headlights switched on, push the lever away from the steering wheel to activate high beam (**BLUE** warning light illuminates).

To flash the headlights, pull the lever part-way towards the steering wheel and then release.

Horn

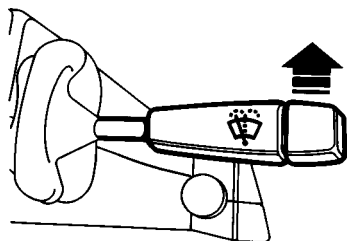
Press end of the lever to operate the horn.

Wipers & washers

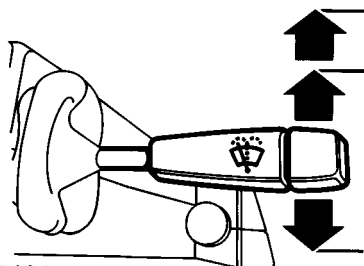
WARNING

To prevent possible overload damage to the linkage or the wiper motors in either freezing or extremely hot conditions, care must be taken to ensure that the wiper blades are not adhering to the glass before operating the wipers.

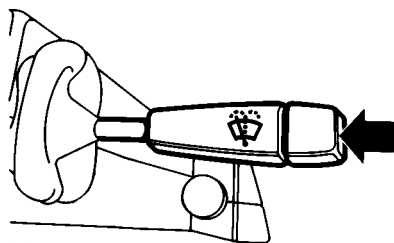
NOTE: Ensure an approved screen washer solvent is used in the windscreen washer reservoir, to prevent freezing.



D033



D034



D035

WINDSCREEN WIPERS

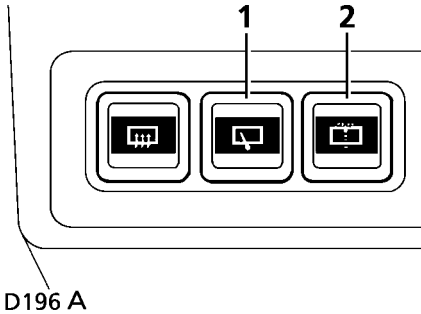
- **Single wipe**
Push the lever up against spring pressure and release immediately.

NOTE: With the lever held up, the wipers will continue operating at high speed until it is released.

- **Intermittent wipe**
Pull lever down.
- **Normal speed wipe**
Push lever up to first position.
- **Fast speed wipe**
Push lever up to second position.

- **Windscreen washer**
Press to operate (the wipers will also operate).

Wipers & washers



Rear window wiper & washer (if fitted)

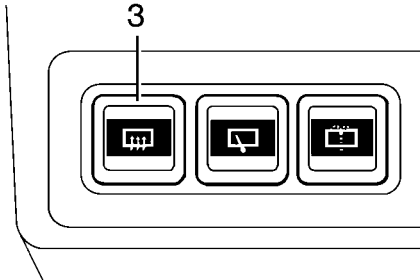
The rear window wiper and washer only operate with the starter switch turned to position 'II'.

- Press the switch (1) to operate the wiper, press again to switch off.
- Press and hold the switch (2) to operate the washer and wiper for the required duration. The wiper will operate four times after the switch is released.

IMPORTANT INFORMATION

- DO NOT operate the wipers on a dry screen.
- In freezing or very hot conditions, ensure that the blades are not frozen, or stuck to the glass.
- In winter, remove any snow or ice from around the arms and blades, including the wiped area of the windscreen and the heater air intakes.

NOTE: If the wiper blades have stuck to the glass, a thermal cut-out may temporarily prevent the wiper motor from operating. If this is the case, switch the wipers off, free them from the obstruction and then switch on again.



D197A

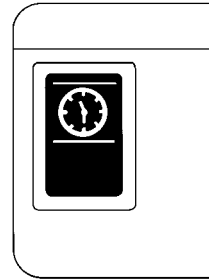
Rear window heater (3) (if fitted)

Press to operate, press a second time to switch off. The warning light on the instrument panel illuminates while the heating elements are switched on and extinguishes when they are turned off.

After 15 minutes continuous operation, the heater switches off automatically.

WARNING

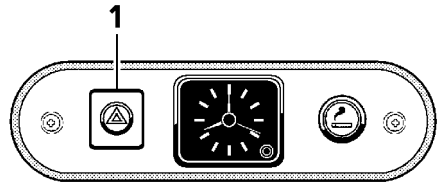
DO NOT stick labels over the heating elements and DO NOT scrape, or use abrasive materials, to clean the inside of the rear window.



D198

Instrument illumination switch

With the headlights or sidelights turned on, press the upper portion of the switch to achieve a low level of illumination and press the lower portion of the switch to illuminate the instrument panel fully.



D182

Hazard warning lights (1)

Press the switch once to operate; all the direction indicator lights (including those fitted to a trailer) and warning lights will flash in conjunction with each other.

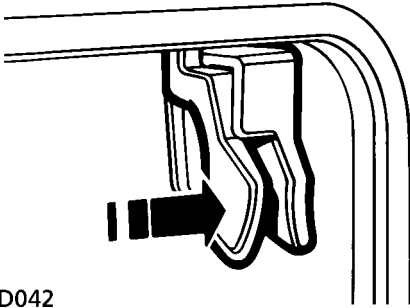
Use **ONLY** in an emergency to warn other road users when your stationary vehicle is causing an obstruction, or is in a hazardous situation. Switch off by pressing the switch again before moving away.

Windows

WINDOWS

Front windows: (Station wagons)

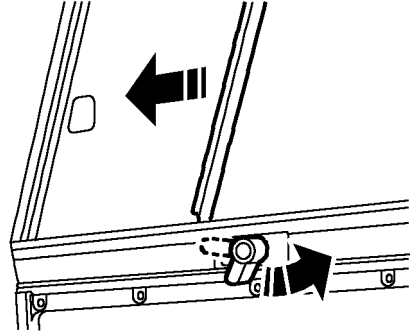
Raise or lower the window by rotating the handle mounted on the door.



D042

Sliding front windows: (Soft top)

Push the lever down to unlock the window and slide the window open as required. Push the lever up to lock the window.

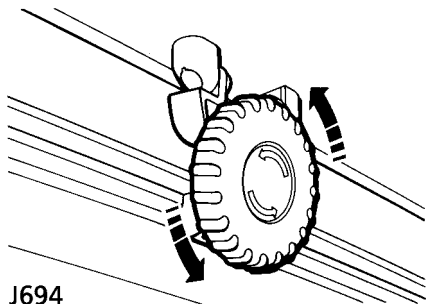


J751

Sliding rear windows: (Station wagons)

To open, press the catch tongues together, slide the window to the desired position and release the catch, ensuring that it locates securely in the sockets, locking the window in position.

Sunroof



J694

SUNROOF (if fitted)

The sunroof can be opened or, if required, can be removed completely.

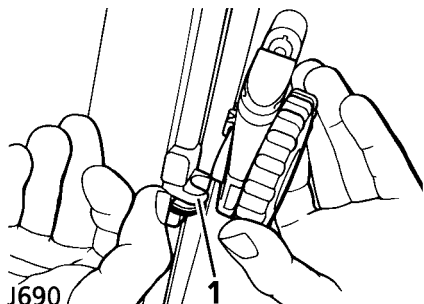
To OPEN the roof:

Turn the hand wheel counter-clockwise to give the desired opening.

NOTE: A partially open sunroof may vibrate due to aerodynamic pressures. Adjust the sunroof aperture to reduce vibration.

To CLOSE the roof:

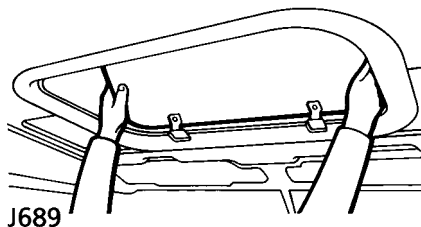
Turn the hand wheel clockwise until resistance is felt.



J690

To REMOVE the roof:

Open the sunroof fully and push the catch (1) rearwards to disengage the hand wheel mechanism.



J689

Remove the sunroof by tilting upwards and lifting rearwards to disengage the locating lugs.

WARNING

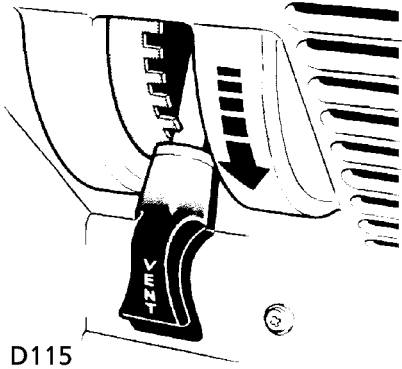
DO NOT store the sunroof loose in the vehicle.

DO NOT allow passengers to extend any part of their bodies through the sunroof while the vehicle is moving.

DO NOT remove the sunroof whilst the vehicle is moving.

Refit the sunroof by following the same procedure in reverse.

Heating & ventilation

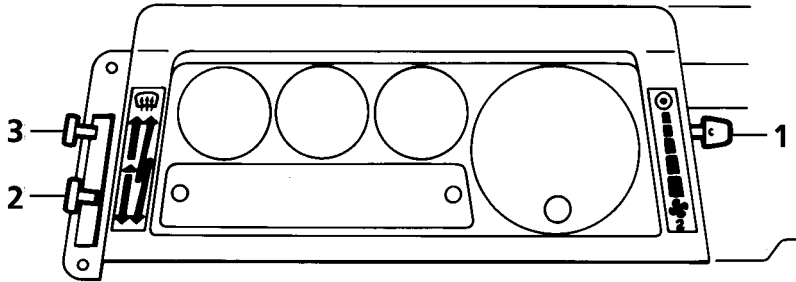


D115

Fresh air vents

To open the two vents in the windscreen frame, push the lever to the right and then downwards to the desired position and release.

The temperature of air supplied to the fresh air vents is not controlled by the heater.



D204

HEATER CONTROLS

1. Fan speed control

With the control at '0', the fan is switched off and no air will enter the vehicle through the heater vents. With the control moved downwards to the first position, the volume of air entering the passenger compartment is solely dependent upon the ram effect of the vehicle moving through the air. The subsequent positions operate the fan at speeds '1' and '2' respectively.

2. Temperature control

Move the lever downwards (towards the RED segment) to increase air temperature, or upwards (towards the BLUE segment) to reduce air temperature.

3. Air distribution control

- Lever fully up - windscreen vents only.
- Lever midway - foot level and windscreen vents.
- Lever fully down - foot level vents (also provides some air to the windscreen).

Heating & ventilation

USING YOUR HEATER

Ensure the front grille and the air intake grille on the front wing are kept clear of obstructions (especially snow and ice).

The following examples of basic heater settings are intended as a general guide; the air distribution, temperature and blower controls can then be further adjusted to suit your comfort requirements.

Always remember that full heating is not available until the engine has reached its normal operating temperature.

Maximum heating

- Temperature control - fully down.
- Distribution control - midway.
- Fan speed control - fully down.
- Fresh air vents - fully closed.

Demisting and defrosting

- Temperature control - fully down.
- Distribution control - fully up.
- Fan speed control - fully down.
- Fresh air vents - fully open for demisting (closed for defrosting).
- Opening a window may improve ventilation.

Maximum ventilation

- Temperature control - fully up.
- Distribution control - fully down.
- Fan speed control - fully down.
- Fresh air vents - fully open.

Air conditioning

USING THE AIR CONDITIONING (if fitted)

If your vehicle has been fitted with an air conditioning system, you may find the following guidelines useful.

Air conditioning provides additional cooling to the vehicle interior and also reduces the moisture content of the air.

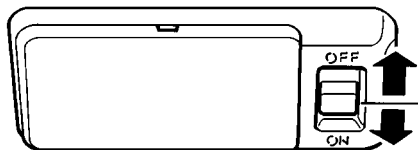
The air conditioning system will only operate with the fan switched on and the engine running. It is also important to keep the windows closed during operation.

Operation of the air conditioning system, places an additional load on the engine which, in very hot conditions and if the engine is required to work unusually hard, could result in high engine temperatures. If the temperature gauge pointer reaches the RED zone, turn the air conditioning off until engine temperature returns to normal.

Points to remember:

- If the temperature inside the vehicle is higher than that outside when you start the engine, it will take time for the air conditioning to become fully effective. It is best to ventilate the vehicle by opening the windows and operating the fan for a brief period before switching on the air conditioning. Remember to close the windows whenever the air conditioning is operating.
- Operating the air conditioning takes power from the engine and consequently increases fuel consumption.
- All air conditioning systems need to be operated for a short while every week (even in winter) to maintain them in peak condition.
- The air conditioning system will also dehumidify air. The surplus water produced by this process is expelled from the system via drain tubes beneath the vehicle. This may result in a small pool of water forming on the road when the vehicle is stationary and is not a cause for concern.

Interior equipment

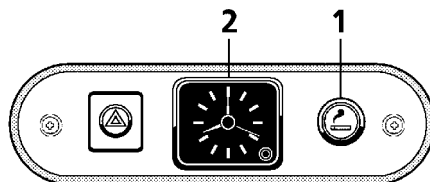


D043

INTERIOR LIGHT

Station wagons:

With the switch midway between the 'ON' and 'OFF' positions, the light will illuminate whenever a door is opened.



D183

CIGAR LIGHTER (1)

With the starter switch turned to position 'II', press the lighter in to heat up. When it has reached the correct temperature it will partially eject and can then be withdrawn for use.

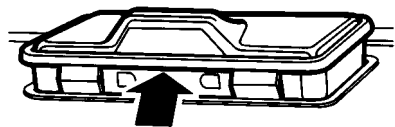
- ONLY hold the cigar lighter by the handle.
- DO NOT use the ashtray for disposing of waste paper or other combustible materials.
- DO NOT plug accessories into the cigar lighter socket unless they are approved for use in your vehicle by Land Rover.

CLOCK (2)

To adjust the time, press and turn the button in the bottom right hand corner of the clock face.

NOTE: The clock will need to be reset, if the battery is disconnected.

Interior equipment



D046

ASHTRAY

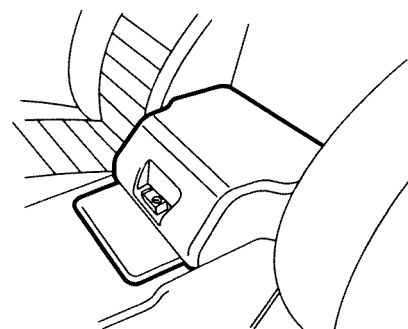
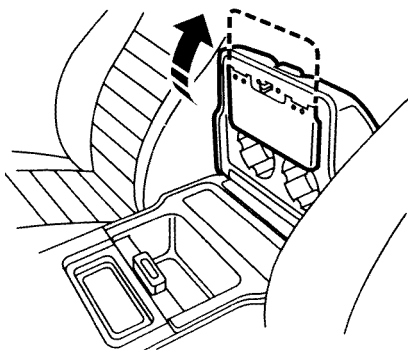
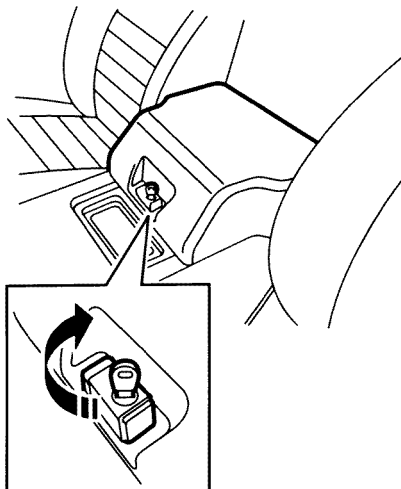
Lift the lid of the ashtray to open. To remove, carefully prise the ashtray out of the fascia panel.

CUBBY BOX

Turn the key clockwise to unlock the cubby box, then squeeze the catch to open. Turn the key counter-clockwise to lock the box.

The flap on the underside of the cubby box lid, can be folded out and, when the lid is shut, acts as a security cover for the in-car entertainment unit. It is recommended that the security cover is used (and the cubby box locked) whenever the vehicle is left unattended.

NOTE: The two recesses to the side of the gear selector are for cups or drink cans.



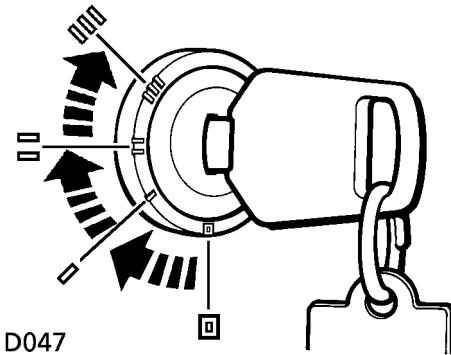
J752

SECTION 3

Driving & operating

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Starter switch & steering lock



To unlock the steering column

Insert the ignition key FULLY and turn the starter switch to position 'I', while turning the steering wheel slightly to disengage the lock.

To lock the steering column

With the main gearshift in 'P' and either High or Low selected in the transfer box, turn the starter switch to position '0' and withdraw the key from the starter switch. Turn the steering wheel towards the straight ahead position until the lock engages.

NOTE: The starter key can NOT be turned to position '0', unless the main gear selector is in the 'P' (Park) position and either High or Low range is selected in the transfer gearbox.

STARTER SWITCH

The starter switch is located to the left of the steering column, and uses the following sequence of key positions to operate the steering lock, electrical circuits and starter motor.

Position '0'

Steering locked (if key is removed).

Ignition key locked in position unless the gearshift is in 'P'.

Most lighting circuits are operational, including: sidelights, headlights and hazard warning lights.

Position 'I'

Steering unlocked.

Radio/cassette/CD player can be operated.

Position 'II'

All instruments, warning lights and electrical circuits are operational.

Position 'III'

Starter motor operates.

Release the key immediately the engine starts (the key will automatically return to position 'II').

Note that operation of position 'I' electrical functions will be interrupted during engine cranking.

NOTE: The engine will not start unless 'P' is selected in the main gearbox and either High or Low range is selected in the transfer gearbox.

STARTING

WARNING

Catalytic converters are easily damaged through improper use, particularly if the wrong fuel is used, or if an engine misfire occurs.

Before starting the engine and driving, ENSURE you are familiar with the precautions shown under 'Catalytic converter', later in this section.

In particular, you should be aware that continued use of the starter, will result in unburnt fuel damaging the catalytic converter.

1. Check that the parking brake is applied and that the main gearshift is in 'P'.
2. Check that the transfer lever is in either the 'H' or 'L' position.
3. Switch off all unnecessary electrical equipment.
4. Insert the starter key and turn the switch to position 'II' and then on to position 'III' to operate the starter motor. DO NOT press the accelerator pedal during starting and RELEASE THE KEY as soon as the engine is running.

In temperate climates, DO NOT operate the starter for longer than 10 seconds. If the engine fails to start, switch off and wait 10 seconds before re-using the starter. Please note that prolonged use of the starter will not only discharge the battery, but may also damage the starter motor.

NOTE: *If the engine fails to start, the starter key must be returned to position 'I' before another attempt is made.*

In temperate climates, the battery charging and oil pressure warning lights should extinguish as soon as the engine is running.

Cold climates

In very cold climates, the battery charging and oil pressure warning lights may take several seconds to extinguish. Similarly, engine cranking times will also increase; at -30° C (-22° F) the starter motor may need to be operated continuously for as long as 30 seconds before the engine will start. For this reason, ensure that all non-essential electrical equipment is switched off.

Additionally, in very cold climates, use of a cylinder block heater will improve the engine's starting characteristics. Your Land Rover dealer can advise you about the supply and use of a cylinder block heater.

Moving off

The main gearshift can NOT be moved from the 'P' (Park) position unless the foot brake is applied. This is a safety precaution to prevent the vehicle moving as soon as a drive gear is selected.

Apply both the parking brake and the foot brake while selecting the required drive position and keep both brakes applied until you are ready to move off.

Warming up

In the interests of fuel economy, it is advisable to start driving straight away, remembering that harsh acceleration or labouring the engine before the normal operating temperature has been reached can damage the engine.

WARNING

Exhaust fumes contain poisonous substances which can cause unconsciousness and may even be fatal.

- *DO NOT inhale exhaust gases.*
 - *DO NOT start or leave the engine running in an enclosed unventilated area, or drive with the rear door open.*
 - *DO NOT modify the exhaust system from the original design.*
 - *DO repair exhaust system or body leaks immediately.*
 - *If you think exhaust fumes are entering the vehicle, have the cause determined and corrected immediately.*
-

Parking

After bringing the vehicle to a stop, ALWAYS apply the parking brake and select 'P' in the main gearbox and either High or Low in the transfer gearbox, before releasing the foot brake and switching off the engine.

Switching off

Return the starter switch to position 'I' and then to position 'O' to remove the key.

Starting & driving

BREAKING-IN

Proper breaking-in will have a direct bearing on the reliability and smooth running of your vehicle throughout its life.

In particular, the engine, gearbox, brakes and tyres need time to bed-in and adjust to the demands of everyday motoring. It is therefore essential to drive with consideration for the breaking-in process for at least the first 500 miles (800 km) and observe the following advice:

- LIMIT maximum speed to 60 mph (95 km/h). Initially, drive the vehicle on a light throttle and only increase engine speeds once the breaking-in distance has been completed.
- DO NOT operate at full throttle or allow the engine to labour in any gear.
- AVOID fast acceleration and heavy braking except in emergencies.

FUEL ECONOMY

Fuel consumption is influenced by two major factors:

- How your vehicle is maintained.
- How you drive your vehicle.

To obtain optimum fuel economy, it is essential that your vehicle is maintained in accordance with the manufacturer's service schedule.

Items such as the condition of the air cleaner element, tyre pressures and wheel alignment can have a significant effect on fuel consumption. But above all, the way in which you drive is most important. The following hints may help you to obtain even better value from your motoring:

- Avoid unnecessary, short, start-stop journeys.
- Avoid fast starts by accelerating gently and smoothly from rest.
- Do not drive in the lower gears longer than necessary.
- Decelerate gently and avoid sudden and heavy braking.
- Anticipate obstructions and adjust your speed accordingly well in advance.

DRIVE GENTLY - SAVE FUEL!

IMPORTANT DRIVING INFORMATION

Instruments & warning lights

Before driving, it is important to fully understand the function of the instruments and warning lights described in section 2.

NOTE: *Red warning lights are of particular importance, illumination indicates that a fault exists. If a red light illuminates, always stop the vehicle and seek qualified assistance before continuing.*

Vehicle stability

Your vehicle has a higher ground clearance and, therefore, a higher centre of gravity than ordinary passenger cars. This will result in different handling characteristics. Inexperienced drivers should take additional care, particularly in off-road driving situations and when performing abrupt manoeuvres at inappropriate speeds or on unstable surfaces.

Vehicle height

The overall height of your vehicle exceeds that of ordinary passenger cars. Always be aware of the height of your vehicle and check the available headroom, before driving through low entrances. This is particularly important if a vehicle is fitted with a roof rack, or if the sunroof (if fitted) is open.

Auxiliary equipment

WARNING

DO NOT use auxiliary equipment such as roller generators, that are driven by one wheel of the vehicle, as they could cause failure of the gearbox differential. If the gearbox differential lock is engaged in an attempt to avoid damage, the vehicle will drive itself forward.

Power assisted steering

Power assistance is progressively applied, the more the steering wheel is turned. For example; where manual steering effort would normally be greatest (at slow speeds on maximum lock), power assistance is greatest. Similarly, where only minimal steering effort would normally be required (at high speed with the wheels straight ahead), then power assistance is also minimal, thus enabling the driver to benefit from apparently consistent steering effort at all times.

WARNING

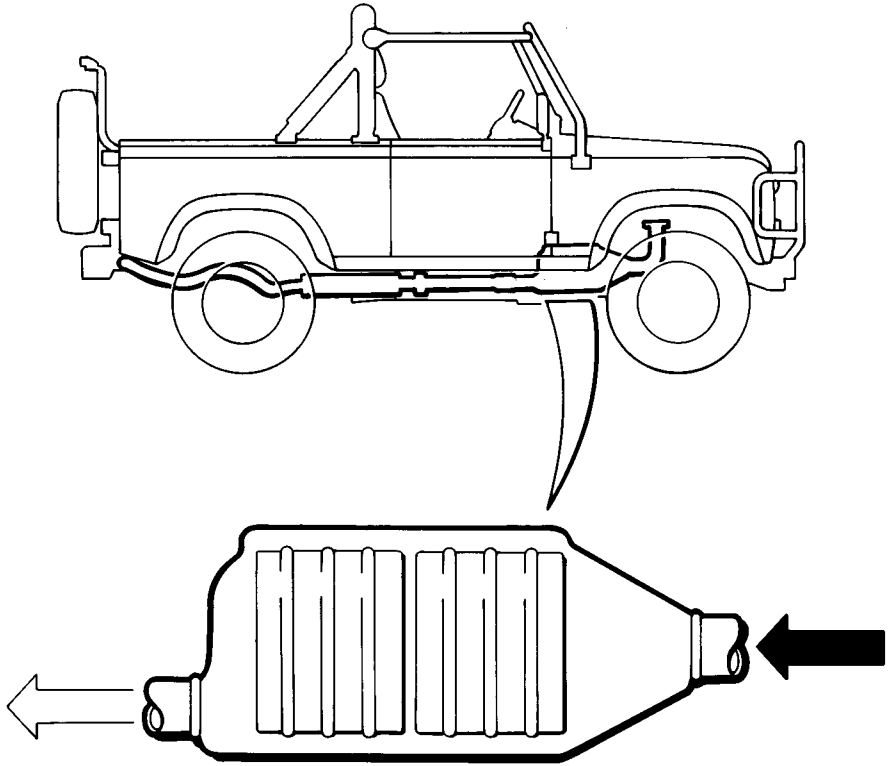
Under no circumstances must the steering wheel be held on full lock for more than thirty seconds in one minute, otherwise the steering assembly may be damaged.

NOTE: *Power assistance is dependent on the engine running. If the engine is not running, greater effort will be required to steer the vehicle.*

WARNING

Modifications to the suspension or steering systems could seriously affect the handling characteristics of the vehicle and are NOT recommended.

Catalytic converter



P0338

CATALYTIC CONVERTER

The exhaust system incorporates a catalytic converter, which converts emissions from the engine, into environmentally less harmful gases - thereby reducing atmospheric pollution.

WARNING

The catalytic converter can be easily damaged through improper use, particularly if the wrong fuel is used, or if an engine misfire occurs. For this reason, it is VERY IMPORTANT that you heed the precautions which follow:

Catalytic converter

Fuel

- Use ONLY fuel recommended for your vehicle.

Starting the engine

- DO NOT continue operating the starter if the engine fails to start after a few attempts (unburnt fuel may be drawn into the exhaust system, thereby poisoning the catalyst) - seek qualified assistance.
- When starting a COLD engine, DO NOT drive if a misfire is suspected - seek qualified assistance.

Driving

- Provided the engine has reached its normal operating temperature, if a misfire is suspected or the vehicle lacks power while driving, it may be driven SLOWLY (at risk of catalyst damage) to a Land Rover dealer for assistance.
- NEVER allow the vehicle to run out of fuel (the resultant misfire could destroy the catalyst).
- Engines burning excessive oil (blue smoke from the exhaust) will progressively reduce catalyst efficiency.
- On rough terrain, DO NOT allow the underside of the vehicle to be subjected to heavy impacts which could damage the catalytic converter.
- DO NOT overload or excessively rev the engine.

WARNING

Exhaust system temperatures can be extremely high - DO NOT park on ground where combustible materials, such as dry grass or leaves, could come into contact with the exhaust system (in dry weather a fire could result).

Switching off

- DO NOT switch off the engine while a forward or reverse gear is selected or whilst the vehicle is in motion.

Vehicle maintenance

- Any engine misfire, loss of engine performance or engine run-on, could seriously damage the catalytic converter. For this reason, it is vital that unqualified persons do not tamper with the engine, and that regular systematic maintenance is carried out by a Land Rover dealer.
- DO NOT run the engine with a spark plug or H.T. lead removed, or use any device that requires an insert into a spark plug.

USE ONLY UNLEADED FUEL

Octane requirements

ALways use PREMIUM UNLEADED GASOLINE, with a CLC or AKI octane rating of 90 or 92.

NOTE: *Federal law requires that gasoline octane ratings be posted on the pumps. The Cost of Living Council (CLC) octane rating, or Anti Knock Index (AKI) octane rating shown, is an average of Research Octane Number (RON) and Motor Octane Number (MON).*

Using unleaded fuel with an octane rating lower than that recommended, can cause persistent, heavy 'engine knock' (a metallic rapping sound). If severe, this can lead to engine damage.

If heavy engine knock is detected when using the recommended octane rated fuel, or if a steady engine knocking is present while maintaining a steady speed on level roads, contact your dealer for advice as soon as possible. Failure to take measures to eliminate either condition, constitutes misuse of the vehicle!

NOTE: *An occasional light engine knock, experienced ONLY for short periods while accelerating or climbing hills, is acceptable.*

WARNING

DO NOT use leaded fuel! Your engine is designed to use unleaded fuel ONLY. Unleaded fuel is essential for proper operation of the emission control system. It also reduces spark plug fouling, exhaust system corrosion and engine oil deterioration.

Even a very small quantity of leaded fuel, will damage your vehicle's emission control system and could invalidate the emissions warranty. In addition, leaded fuel will damage the oxygen sensors in the fuel injection system and also seriously damage the catalyst in the catalytic converter.

Reformulated gasolines and gasolines that contain detergents, anti-corrosion and stability additives, are recommended - they will help your vehicle maintain the correct level of emissions and engine performance.

Fuel system cleaning agents should be avoided, as many of these products can be harmful to gaskets and other materials used in fuel system components.

NOTE: *If you encounter driveability, starting and stalling problems, especially in high ambient temperatures or at high altitude, it may be caused by poor quality fuel. Try an alternative brand and, if the problem persists, seek advice from your dealer.*

Gasoline/oxygenated fuel blends

To avoid invalidating the vehicle warranty, use ONLY fuels blended within the following limits.

1. Up to 15% of Methyl Tertiary Butyl Ether (MTBE) and unleaded fuel mix.
2. Up to 15% of Ethyl Tertiary Butyl Ether (ETBE) and unleaded fuel mix.
3. Up to 10% of Ethanol (Ethyl or grain alcohol) and unleaded fuel mix.
4. Up to 5% of Methanol (Methyl or wood alcohol with cosolvents and corrosion preventatives) and unleaded fuel mix.

WARNING

Take precautions to avoid methanol coming into contact with the skin.

Fuel filling

WARNING

To avoid any sudden discharge of fuel caused by excessive air pressure, the cap is designed to allow the fuel tank to vent during the first half turn. DO NOT fully remove the cap until pressure has been released.

Unless absolutely necessary, the fuel filler cap should not be removed unless the vehicle is standing on level ground.

DO NOT OVERFILL!

Most filling station pumps are equipped with automatic cut-off sensing to avoid fuel spillage - only fill the tank until the filler nozzle automatically shuts off. DO NOT attempt to fill the tank beyond this point, or spillage could result due to expansion of the fuel.

WARNING

DO NOT fully fill the tank if the vehicle is to be parked on a slope, in direct sunlight or high ambient temperature - expansion of the fuel could cause spillage.

NOTE: When replacing the filler cap, tighten clockwise until the fuel cap ratchet clicks at least three times.

Empty fuel tank

DO NOT RUN THE FUEL TANK DRY!

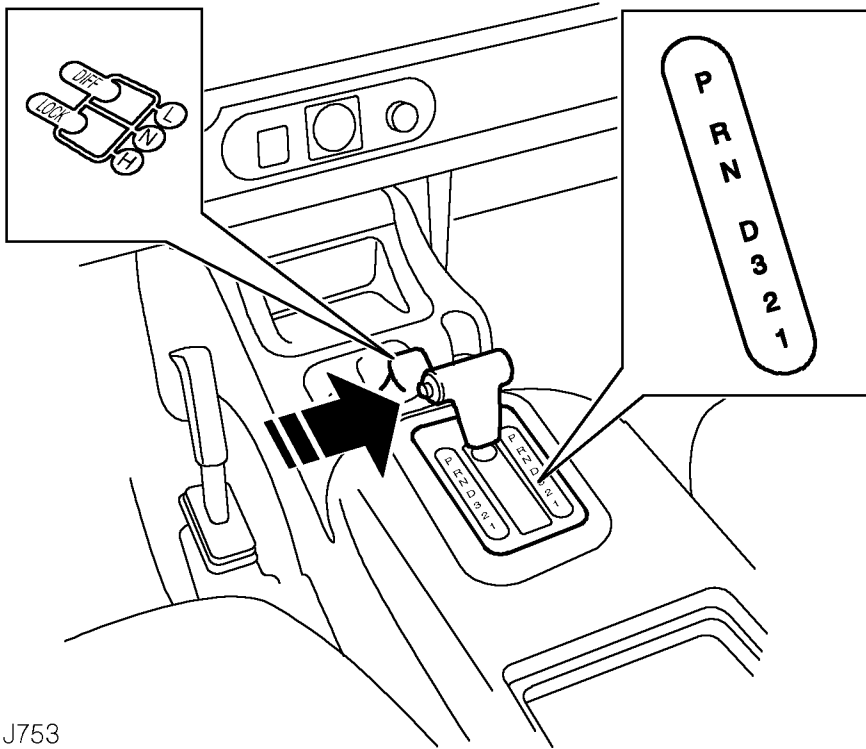
Running the fuel tank dry could create an engine misfire capable of damaging the catalytic converter.

GAS STATION SAFETY

Petroleum gases are highly inflammable and in confined spaces are also explosive. Always take sensible precautions when refuelling:

- Switch off the engine.
- DO NOT smoke or use a naked flame or light.
- Take care not to spill fuel.
- DO NOT overfill the tank.

Gearbox & transmission



J753

AUTOMATIC TRANSMISSION

The automatic transmission features a four speed main gearbox with a torque converter and a two speed transfer box. A centre differential in the transfer box distributes power to both front and rear axles, providing permanent four wheel drive. Using the main gearbox in conjunction with the transfer gearing, produces eight forward and two reverse speeds.

Main selector lever

A spring loaded catch, built into the handle of the gear selector lever, restricts movement of the lever, thereby preventing inadvertent gear selection. Press and hold the button (arrowed in illustration) to release the catch whilst moving the lever to the required position.

NOTE: Gear selection between 'D' and '3' may be made without holding in the button.

NOTE: The selector lever cannot be moved from 'P' into a drive position unless the starter switch is in position 'I' and the foot brake is applied.

Gearbox & transmission

Automatic selector lever positions

'P' (Park)

In this position the transmission is locked to prevent the vehicle from rolling away. Select ONLY with the vehicle stationary and the parking brake on.

'R' (Reverse)

Select ONLY when the vehicle is stationary.

'N' (Neutral)

Use this position when the vehicle is stationary and the engine is to idle for a prolonged period (eg. at traffic lights).

'D' (Drive)

Select drive for all your normal driving on good road surfaces; fully automatic gear changing occurs on all forward gears according to vehicle speed and accelerator position.

'3' (1st, 2nd and 3rd gears)

Automatic gear changing is limited to first, second and third gears only. Use in congested traffic conditions and for town driving.

'2' (1st and 2nd gears)

Automatic gear changing is limited to first and second ratios only. Use when driving up steep gradients and for negotiating very narrow twisting roads. This position also provides moderate engine braking for descending steep slopes.

NOTE: *If either '2' or '1' is selected from 'D' or '3' when the vehicle is travelling at high speed, third gear will immediately engage. Progressive deceleration will then cause downshifts into second then first gear at the appropriate road speeds.*

'1' (1st gear only)

Use on very severe gradients, particularly when towing, and when maximum engine braking is required.

WARNING

When parked, always leave the vehicle with the gear selector in 'P' and the parking brake applied.

NOTE: *The starter key cannot be turned to position '0' unless the main gear selector is in the 'P' (Park) position and either High or Low range is selected in the transfer gearbox.*

Starting and driving

NOTE: *The engine will not start unless 'P' is selected in the main gearbox and either High or Low range is selected in the transfer box.*

Drivers unfamiliar with the performance characteristics of automatic transmission should thoroughly familiarise themselves with the following instructions before driving.

- Before starting the engine, ensure that both foot and parking brake are applied.
- After starting the engine, KEEP BOTH BRAKES APPLIED before and whilst moving the selector lever to the required drive position (the selector lever cannot be moved from 'P' to a drive position, unless the foot brake is applied).
- Keep the brakes applied until you are ready to move - remember, once a drive gear is selected, an 'automatic' will tend to creep forward (or backward).
- Never 'rev' the engine while selecting a forward or reverse drive gear, or while the vehicle is stationary with a drive gear selected - remember, an 'automatic' will move immediately when the accelerator pedal is pressed.

Gearbox & transmission

Gear change speeds

With 'D' selected, the road speed at which gear changes take place will vary according to the position of the accelerator. Minimum acceleration will result in low road speed gear changes, while larger throttle openings will cause the main gearbox to delay gear changes until faster road speeds have been reached (thereby increasing acceleration).

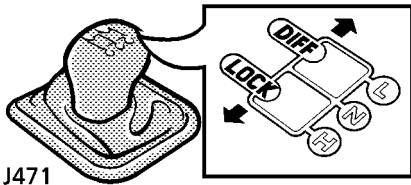
With practice, gear changes can be made to occur at a wide range of different road speeds, depending on accelerator pedal pressure.

On long inclines, an automatic gearbox will sometimes change back and forth between gears. This occurs because the transmission does not include a ratio that is precisely right for the particular incline and vehicle loading circumstances. Excessive gear changing is wasteful of fuel and results in a loss of momentum. It can be prevented by selecting the '3' or '2' positions which limit the gearbox to lower ratios.

'Kick-down'

To provide rapid acceleration for overtaking, 'kick' the accelerator pedal to the full extent of its travel in a single, quick movement (known as 'kick-down'). Up to a certain speed, this will cause an immediate downshift into the lowest appropriate gear, followed by rapid acceleration. Once the pedal is relaxed, normal gear change speeds will resume (dependent on road speed and accelerator pedal position).

Gearbox & transmission



J471

TRANSFER GEARBOX

The two speed transfer gearbox, is used to select either the high or low range of gears and, in addition, also controls the centre differential (known as the 'DIFF LOCK').

A shift interlock safety feature is fitted which prevents any transfer box gear selection being made unless the ignition is switched on and the automatic gearbox selector is in the 'P' (Park) or 'N' (Neutral) positions.

An ignition interlock safety feature prevents the engine from starting unless 'P' is selected in the main gearbox and either High or Low range is selected. The ignition interlock also prevents the key from being turned to position '0' unless the same conditions are met.

High range ('H')

Use high range for all normal road driving and also for off-road driving across dry, level terrain.

Low range ('L')

Use low range gears when moving off from rest when towing a heavy load, or in any situation where low speed manoeuvring is necessary, such as reversing a trailer or negotiating a boulder strewn river bed; also use low range for more extreme off-road conditions, where progress in high range cannot be maintained.

WARNING

DO NOT attempt to change to LOW range gears for normal road driving.

Neutral ('N')

With the transfer lever in neutral, drive cannot be transmitted to the road wheels, regardless of the position of the main gear lever. Use transfer neutral when the vehicle has to be towed on four wheels, or when using winching facilities.

Audible warning

A constant, high pitched, audible warning chime will sound whenever the vehicle starter switch is turned on when the transfer gearbox lever is in the 'neutral' position. The warning is intended to remind the driver that the appropriate 'High' or 'Low' range gearing should be engaged.

'Diff lock' centre differential

Use the 'unlocked' position for all normal driving, and use the 'DIFF-LOCK' position to improve traction in extreme conditions where wheel grip could be lost, such as: wet grass, mud, sand, ice or snow. Return to the 'unlocked' position as soon as dry, firm, ground is reached.

DO NOT use the 'diff lock' unnecessarily!

Gearbox & transmission

USING THE TRANSFER GEARBOX

There are two ways of operating the transfer gearbox lever; the 'normal' method - recommended for inexperienced drivers - and the 'advanced' method for experienced drivers.

Normal method

With the vehicle stationary and the engine running, apply both foot brake and parking brake and then move the main gear selector to the 'N' (neutral) position before moving the transfer lever fully forward or backwards to the required position.

If there is resistance to the gear engaging, do not force the lever. Instead, with the engine running, apply the foot brake and parking brake, momentarily engage 'D' on the main gearbox then return it to the 'N' position and try again.

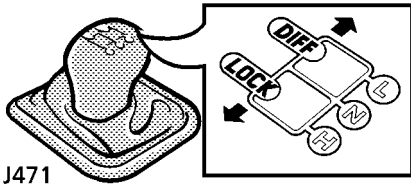
Advanced method

Changing from 'H' (high) to 'L' (low) or vice versa without stopping the vehicle can be achieved as follows:

Reduce (or increase) the speed of the vehicle to 5 mph (8 km/h) and release the accelerator. Select 'N' with the main gear selector and move the transfer lever quickly to the required 'H' or 'L' position. Finally, reselect 'D' with the main gear selector and continue driving as normal.

NOTE: *This operation applies to 'H' to 'L' and 'L' to 'H' changes equally.*

Gearbox & transmission



THE DIFFERENTIAL LOCK

Unlike some four wheel drive vehicles, all Land Rover vehicles have permanent four wheel drive. This is achieved by the inclusion of a lockable differential between the front and rear drive shafts. With the differential locked, the drive shafts to front and rear axles are (in effect) joined together, causing both to rotate at the same speed. This is a normal feature with all four wheel drive vehicles and enhances traction on difficult off-road surfaces. However, with the differential unlocked the different running requirements of the two axles can be accommodated, thereby enabling Land Rover vehicles to operate permanently in four wheel drive for both normal AND off-road use.

Selecting diff lock

The diff lock can be engaged, or disengaged, either with the vehicle stationary, or when driving at any road speed. However, with the vehicle in motion, it is **ESSENTIAL** to be travelling on firm ground, in a straight line, and without wheel slip.

WARNING

DO NOT engage the diff lock if one or more wheels are slipping - this could damage the transmission. If wheels are slipping, ease off the accelerator before engaging the diff lock.

DO NOT engage the diff lock from the transfer neutral position.

To lock the differential:

Move the transfer gear lever to the left - from either 'H' (high) or 'L' (low) position (the warning light on the instrument panel will illuminate).

To unlock the differential:

Move the transfer gear lever to the right - to either 'H' (high) or 'L' (low) position as required; when the diff lock disengages the warning light will extinguish.

Gearbox & transmission

When to use the diff lock

As a general rule, the differential should only be locked in order to drive off-road on loose and slippery surfaces, or on-road where extreme ice or snow conditions are encountered.

ALWAYS unlock the differential for normal road driving, or as soon as a hard grippy surface is reached, whether high or low gears are selected.

NOTE: *A valuable introduction to off-road driving, which includes many useful references to the transfer gearbox and 'diff lock', is included in the 'Off-road driving' section of the handbook.*

WARNING

If the vehicle is driven on normal road surfaces with the differential locked, the steering will feel stiff, excessive tyre wear will occur and the transmission will be 'wound up'. This places excessive strain on the transmission.

IMPORTANT INFORMATION

Transmission 'wind up'

If the warning light is obviously reluctant to extinguish after the diff lock has been deselected, some transmission 'wind up' may be present.

Reversing the vehicle for a short distance and then going forward will usually 'unwind' the transmission and extinguish the light and the vehicle can then be driven as normal. However, if after two or three attempts to 'unwind' the transmission the light remains on, consult your dealer AS SOON AS POSSIBLE.

Diff lock warning light

The amber warning light on the instrument panel illuminates when the diff lock is actually engaged - rather than when it has been selected. Similarly it will only extinguish when the diff lock is actually disengaged. This accounts for a slight delay between diff lock deselection and the warning light extinguishing which is quite normal.

Brakes

BRAKING SYSTEM

As a safety precaution, the hydraulic braking system operates through dual circuits. If one circuit fails, the other will continue to function, but increased brake pedal travel and longer stopping distances will be experienced.

Servo assistance

The braking system is servo assisted, but ONLY when the engine is running. Without this assistance, greater braking effort is necessary to safely control the vehicle, resulting in longer stopping distances. Always observe the following precautions:

- NEVER allow the vehicle to coast with the engine turned off.
- ALWAYS take particular care when being towed with the engine turned off.
- If the engine should stop for any reason while the vehicle is in motion, bring the vehicle to a halt as quickly as traffic conditions safely allow, and DO NOT pump the brake pedal as the braking system may lose any remaining assistance available.

Brake pads

Brake pads require a period of bedding in. You should avoid heavy braking, except in emergencies, for at least the first 500 miles (800 km).

Remember that regular servicing is vital to ensure that the brake pads are examined for wear and changed periodically to ensure long term safety and optimum performance.

WARNING

DO NOT rest your foot on the brake pedal while travelling, as this may overheat the brakes, reduce their efficiency and cause excessive wear.

NEVER move a vehicle without the engine running, because braking assistance will not be available. The pedal brakes will still function, but more pressure will be required.

NEVER place additional floor matting, or any other obstruction, under the brake pedal. This restricts pedal travel and braking efficiency.

ALWAYS take particular care when being towed with the engine turned off.

If the brake warning light should illuminate while the vehicle is in motion, bring the vehicle to a halt as quickly as traffic conditions and safety permit and seek qualified assistance before continuing - DO NOT pump the brake pedal. If the brake pedal is pumped, the braking system may lose any remaining assistance available.

Wet conditions

WARNING

Driving through water, or even very heavy rain, may adversely affect braking efficiency. Always dry the braking surfaces by intermittent light application of the brakes, first ensuring that you are at a safe distance from other road users.

Brakes

PARKING BRAKE

Unlike most other vehicles, the parking brake operates on the rear propeller shaft, and NOT on the road wheels. This may result in slight movement of the vehicle after the parking brake is applied.

To engage the parking brake, depress the button and pull the lever up.

To release, pull the lever up slightly, depress the button and lower the lever.

Always apply the parking brake fully whenever you park.

When parking on steep slopes, move the transfer lever into low range or engage the diff lock, for extra security.

WARNING

DO NOT apply the parking brake while the vehicle is in motion, as this could result in loss of vehicle control and damage to the transmission.

DO NOT rely on the parking brake to operate effectively, if the vehicle has been subjected to immersion in mud and water (see 'Off-road driving').

ALWAYS use the wheel chock when jacking the vehicle. Even with the parking brake applied, vehicle movement is likely due to tolerances in the transmission.

Towing & load carrying

TOWING

The torque ranges of Land Rover engines allow maximum-weight loads to be pulled smoothly from standstill and reduce gear changing on hills or rough terrain.

WARNING

Only fit towing accessories that have been designed and approved by Land Rover.

Ensure that the gross weight and maximum axle weights are not exceeded.

Trailer hitch

Your vehicle is equipped with a Class III trailer hitch receiver as standard equipment. When selecting a trailer hitch, always observe the following guidelines:

- The drop height from the draw bar pin to the ball mounting surface must not exceed 3 in (76 mm).
- The hitch length from the drawbar pin to the ball centre line must not exceed 9 in (229 mm).
- Never use a load equalising or any other form of weight distributing hitch with your vehicle.

WARNING

Failure to follow these guidelines and measurements, may result in damage to the trailer hitch and may have adverse effects on both braking and handling characteristics.

When preparing your vehicle for towing, always pay careful attention to the trailer manufacturer's recommendations and the following guidelines.

- Ensure that the towing vehicle tyre pressures are correct and that the trailer tyre pressures are as recommended by the trailer manufacturer.
- With the trailer and vehicle unladen, select a draw bar drop that enables the trailer to sit level. The draw bar drop must not exceed 3 in (76 mm).
- Check the operation of trailer brakes and lights.
- For maximum stability, ensure that loads are properly secured and unable to shift position during transit. Also, position loads so that most of the weight is placed close to the floor and, where possible, immediately above or close to the trailer axle(s).
- After loading the trailer, check that the weight on the hitch ball (this is called the tongue weight), is in accordance with the manufacturer's recommendations.
- When calculating the laden weight of the trailer, remember to include the weight of the trailer PLUS THE LOAD.
- Where the load weight can be divided between trailer and tow vehicle, loading more weight into the vehicle will generally improve the stability of the combination.

Towing & load carrying

NOTE: It is very important to ensure that national regulations governing towing weights and speed limits are observed (refer to an appropriate motoring organisation for information). The following maximum permissible towed weights refer to the vehicle's design limitations and NOT to any specific territorial restriction.

Maximum permissible towed weights	On-road	Off-road
Unbraked trailers	1653 lb (750 kg)	1102 lb (500 kg)
Trailers with brakes	7716 lb (3500 kg)	2204 lb (1000 kg)

TONGUE WEIGHT

The maximum trailer tongue weight is 350 lb (160 kg). The tongue weight, plus the combined weight of the vehicle's load carrying area and passengers, must never exceed the maximum rear axle load or the gross vehicle weight (as shown in 'General data').

WARNING

DO NOT carry unsecured equipment, tools or luggage which could move and cause personal injury in the event of an accident or emergency manoeuvre, either on or off road.

VEHICLE WEIGHTS

When loading a vehicle to its maximum (gross vehicle weight), consideration must be taken of the unladen vehicle weight and the distribution of the load, to ensure that axle loadings do not exceed the permitted maximum values.

It is your responsibility to limit the vehicle load in such a way, that neither the maximum axle loads, nor the gross vehicle weight are exceeded (see 'General data').

WARNING

The tongue weight, plus the combined weight of the vehicle's load carrying area and passengers (if applicable), must never exceed the maximum rear axle load or GVWR.

Towing & load carrying

Trailer socket

When the engine is running, power consumption from the trailer socket must NOT exceed 5 amps.

WARNING

ALWAYS consult your dealer for advice regarding the approval, suitability, installation and use of any parts or accessories before fitting.

ROOF RACK

ALWAYS use an approved roof rack and follow the manufacturer's fitting instructions carefully. A full list of all available accessories is available from your Land Rover dealer.

IMPORTANT INFORMATION

- The MAXIMUM roof rack load is 165 lb (75 kg).
- A loaded roof rack can reduce the stability of the vehicle, particularly when cornering and encountering cross winds.
- All loads should be evenly distributed and secured within the periphery of the rack.
- Always secure the load to the side rails, not just to the cross rails.
- Only fit roof racks that have been designed for your vehicle. If in doubt, consult your dealer.

Emergency starting

Starting an engine with a discharged battery

The ONLY recommended methods of restarting a vehicle with a discharged battery are:

- The use of a substitute battery fitted to the disabled vehicle.
- The use of booster cables to connect the battery from a donor vehicle to the discharged battery.

USING BOOSTER CABLES

WARNING

Batteries emit explosive hydrogen gas - keep sparks and open flame away from the battery compartment.

DO NOT attempt to jump start the vehicle if the electrolyte in the battery is suspected of being frozen.

DO NOT disconnect the discharged battery.

Make sure BOTH batteries are of the same voltage (12 volts), and that the booster cables have insulated clamps and are approved for use with 12 volt batteries.

DO NOT connect positive (+) terminals to negative (-) terminals, and ensure booster cables are kept away from any moving parts in the engine compartment.

Take care when working near rotating parts of the engine.

Always adopt the following procedure when using booster cables:

1. If a donor vehicle is to be used, both vehicles should be parked with their battery locations adjacent to each other. Ensure that the two vehicles do not touch.
2. Apply the parking brakes and ensure that the transmission of both vehicles is set in 'P' (neutral for donor vehicles fitted with manual transmission).
3. Turn off the starter switch and ALL electrical equipment of BOTH vehicles.
4. Connect the RED booster cable between the positive (+) terminal of the donor battery and the positive (+) terminal of the discharged battery.
5. Connect the BLACK booster cable from the negative (-) terminal of the donor battery to a good earthing point on the disabled vehicle (eg. an engine mounting or other unpainted metal surface) - at least 20 in (0.5 m) from the battery and well away from fuel and brake lines. **For safety reasons, DO NOT connect this cable to the negative terminal of the discharged battery.**
6. Check that the booster cables are clear of any moving parts in either engine, then start the engine of the donor vehicle and allow it to idle for a few minutes.
7. Now start the vehicle with the discharged battery (DO NOT crank the engine for more than 15 seconds at a time).

Emergency starting

8. Once both engines are running normally, allow them to idle for two minutes before switching off the engine of the donor vehicle and disconnecting the booster cables. DO NOT switch on any electrical circuits on the previously disabled vehicle, until AFTER the booster cables have been removed.
9. Disconnecting the booster cables must be an EXACT reversal of the connecting procedure, ie; **disconnect the BLACK cable from the earthing point on the disabled vehicle FIRST.**

Vehicle recovery

VEHICLE RECOVERY

If it is necessary to recover the vehicle by towing, always adhere to the following procedure:

Towing the vehicle (on four-wheels)

1. Turn the starter switch to the first position to unlock the steering and leave in this position while the vehicle is being towed.
2. Set the main gearbox and transfer box in neutral.
3. Ensure the differential lock is in the unlocked position.
4. Secure the towing attachment to the vehicle.
5. Release the parking brake.

NOTE: *If, due to an accident or electrical fault, it is not considered safe to turn the starter switch, the battery must be disconnected.*

IMPORTANT INFORMATION
<p>DO NOT attempt to tow the vehicle unless the starter switch is turned to position 'I' (to unlock the steering and to enable neutral to be selected in the main and transfer gearboxes).</p> <ul style="list-style-type: none">• DO NOT attempt to remove the starter key, or turn the switch to position '0', while the vehicle is in motion.• Without the engine running, the brake servo and power steering pump cannot provide assistance. Greater brake pedal and steering effort, are therefore necessary to safely control the vehicle.

Suspended tow

WARNING

Your vehicle has permanent four wheel drive - the propeller shaft MUST be removed from the axle to be trailed.

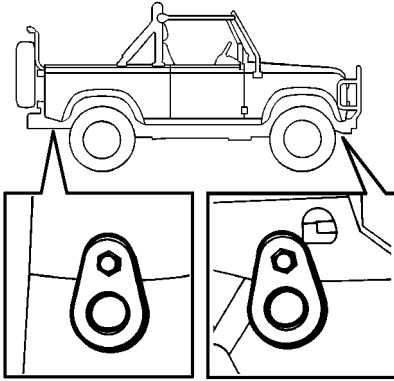
If the front axle is to be trailed, ALWAYS adhere to the following precautions:

- Ensure the four bolts securing the front propeller shaft to the gearbox, are tightly secured with the appropriate nuts after disconnecting the propeller shaft - otherwise serious damage to the gearbox may occur.
- Unlock the steering.
- Secure the steering wheel and/or linkage, in the straight ahead position - the steering lock MUST NOT be used for this purpose.

WARNING

The propeller shaft MUST only be reconnected by a qualified Land Rover dealer.

Vehicle recovery



D184

Transporter or trailer lashing

Use the towing rings on the front and rear cross members as lashing points (see illustration). DO NOT secure lashing hooks or trailer fixings, to any other part of the vehicle.

Canopy removal & fitting

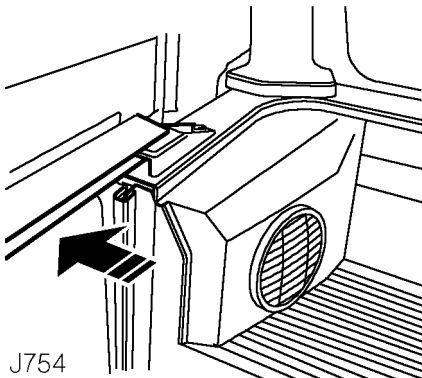
FULL CANOPY (Soft top)

The full canopy can only be fitted, when a full Safari roll cage has been installed on the vehicle.

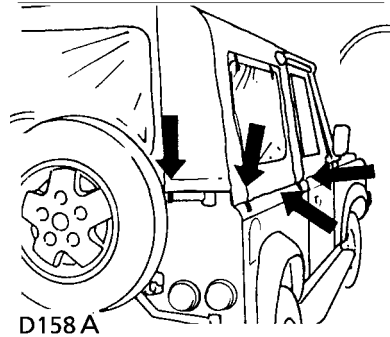
CANOPY REMOVAL

WARNING

The canopy fitted to this vehicle, is designed ONLY for protection against the elements. The canopy is NOT designed to contain occupants within the vehicle, or to protect against injury in the event of an accident.

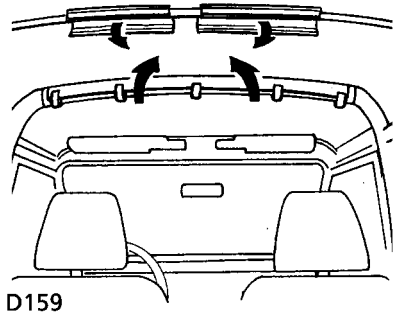


1. From inside the rear of the vehicle, undo the side zips of the rear window and open the rear door. To release the retaining batten at the bottom of the rear window panel, strike each end of the batten sharply outwards with the palm of the hand. Undo the top zip of the panel and remove the window.



2. Unzip and remove the side window panels. Pull the tags (arrowed) to release the plastic battens (securing the side and rear canopy panels to the vehicle) from their retaining channels.

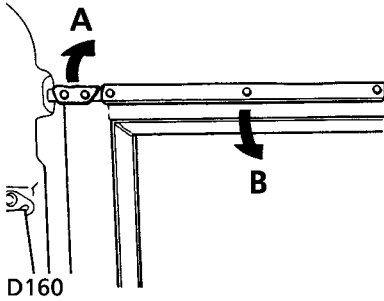
NOTE: Windows should be cleaned and stored separately in the window storage bag (see 'Cleaning the canopy' on a later page).



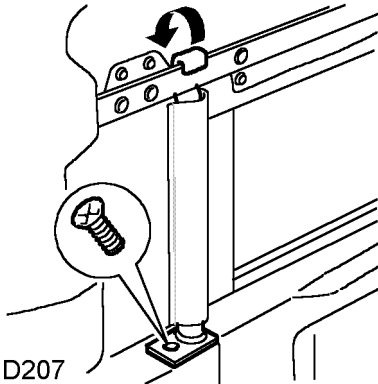
3. From inside the rear of the vehicle, unfasten the press studs securing the canopy attachment flaps to the rear and centre roll bars, and detach the intermediate roof bow flaps.

Canopy removal & fitting

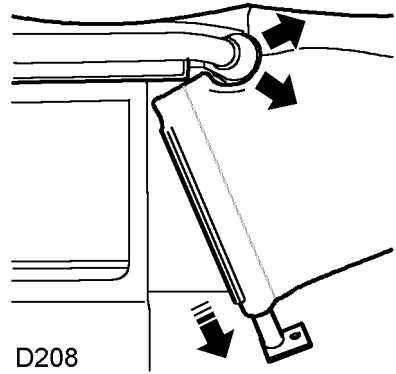
Canopy removal (cont.)



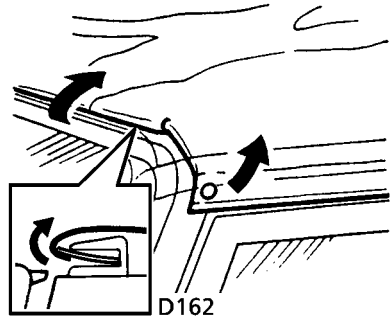
- From inside the driving compartment, unfasten the two pairs of press studs (A), securing the canopy side panels to the support bars. Open both doors and unfasten the press studs (B), securing the canopy panel to the support bars.



- Remove the screws securing the side panel support rods to the vehicle body and unhook the top end of the rods from the support bars.



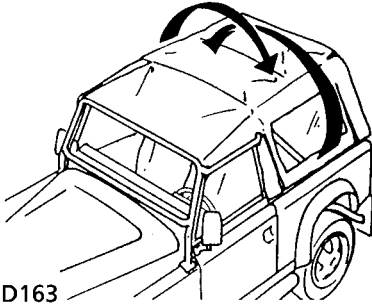
- Remove the top of the side panels from the groove in the side bar mouldings and withdraw the support rods from the pockets in the side panels.



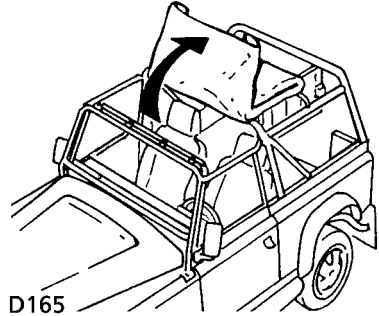
- Unfasten the press studs securing the canopy front panel to the windscreen surround, pull the canopy forward and release the plastic batten from the retaining channel (see inset), on the top of the windscreen surround.

Canopy removal & fitting

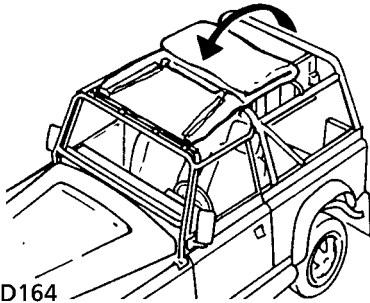
Canopy removal (cont.)



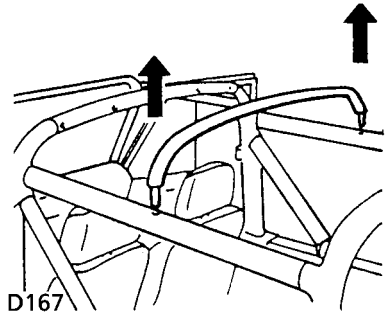
8. Throw the side panels up over the top of the roll bar frame.



10. Fold back the canopy front panel over the top and remove the canopy from the vehicle.



9. Throw the rear panel up over the top of the roll bar frame, onto the side panels. Fold again to the rear of the front panel and leave supported by the centre bar and the intermediate roof bow.



11. Remove the intermediate roof bow and store with the folded canopy in a dry, well ventilated area.

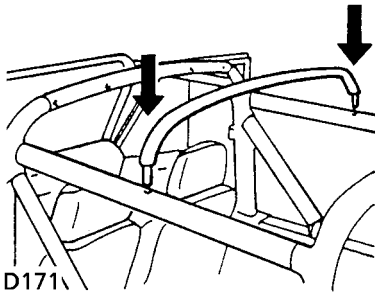
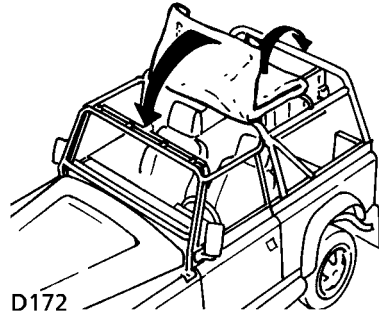
Canopy removal & fitting

FULL CANOPY FITTING

WARNING

The canopy fitted to this vehicle, is designed ONLY for protection against the elements. The canopy is NOT designed to contain occupants within the vehicle, or to protect against injury, in the event of an accident.

Seat belts must be worn at all times.



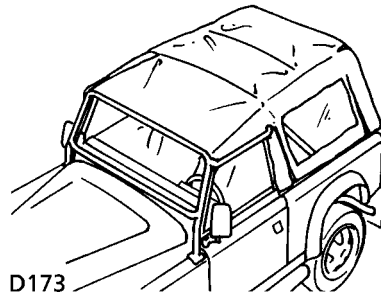
1. Fit the intermediate roof bow where shown (midway between the centre and rear roll bars).

WARNING

DO NOT attempt to fit the canopy in temperatures below 72° F. If necessary, use heat lamps or the vehicle's heater to warm the canopy.

DO NOT use the pull tabs around the bottom of the canopy to pull it tightly over the safari cage - they are only to assist in canopy removal.

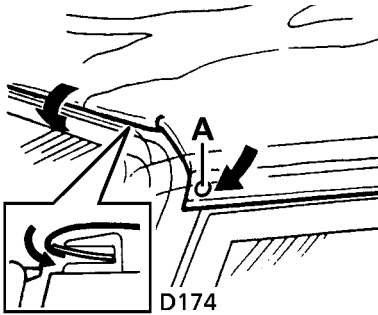
2. Place the folded canopy on top of the safari cage, supported by the centre roll bar and intermediate roof bow.



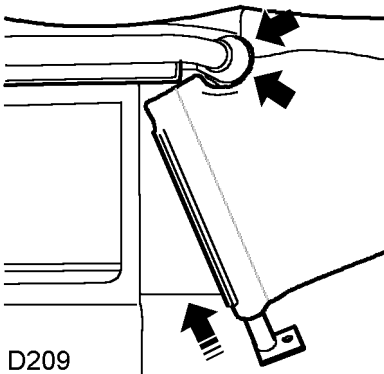
3. From inside the rear of the vehicle, unfold the canopy, visually adjusting for approximate fit over the frame.

Canopy removal & fitting

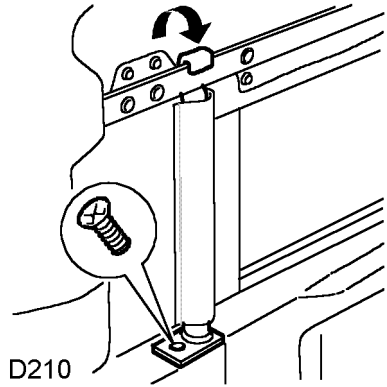
Canopy fitting (cont.)



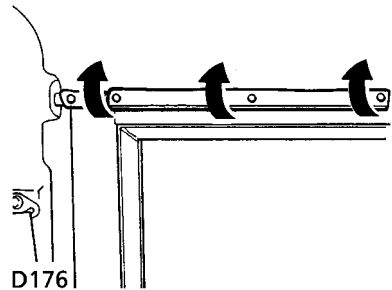
4. Fit the canopy batten into the retaining channel running across the top of the windscreen (see inset). Ensure that both right and left corners are seated into the channel and then secure with the press studs (A).



5. Insert the side panel support rods into the pockets, ensuring that the flat bottom of the rods is facing rearwards and that the 'hooked' top end is facing inwards. Feed the top of the side panels into the grooves in the side bar mouldings.



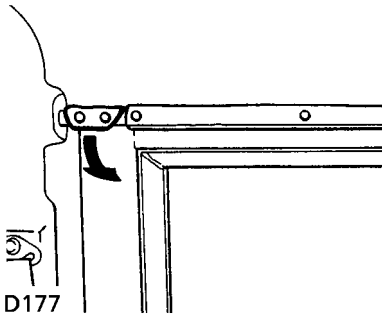
6. Hook the top of the support rods over the canopy support bars and fit the rubber caps over the hooked end of the rods. Insert the screws through the flat bottom of the support rods into the existing holes in the vehicle body.



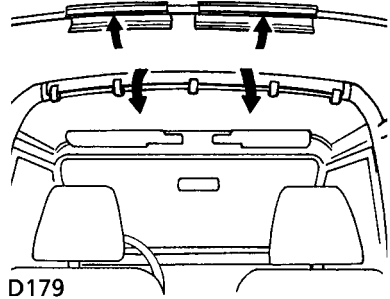
7. From inside the driving compartment, fasten the press studs securing the sides of the canopy front panel to the right and left hand support bars.

Canopy removal & fitting

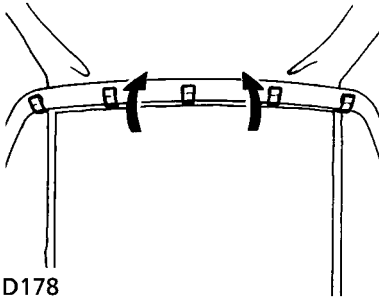
Canopy fitting (cont.)



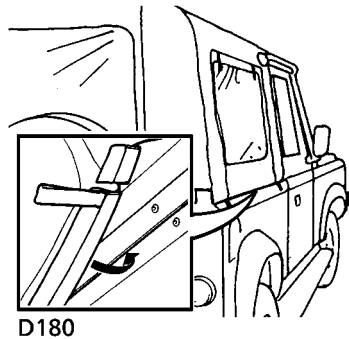
8. Fasten the two pairs of press studs securing the left and right hand side panels to the support bars.



10. Fasten the press studs securing the canopy to the centre roll bar. Wrap the attachment flaps around the intermediate roof bow and secure with the velcro strips.



9. Stretch the canopy rearwards over the safari frame and smooth it down. From inside the rear of the vehicle, fasten down the press studs securing the canopy to the rear roll bar.



11. Fold down the rear canopy flap and refit the side window panels. Secure the bottom of the side and rear quarter panels, by firmly pressing the plastic battens into the retaining channels (see inset).

Canopy removal & fitting

Canopy fitting (cont.)

12. Fasten the top zip on the rear window panel. To secure the rear window retaining batten, push firmly on each end of the batten until it is heard to clip into place. Finally, fasten the rear window side zips and ensure the surrounding velcro strips are secured.

NOTE: *Additional velcro strips are fitted at certain points on the interior of the canopy, to improve protection from the elements.*

CLEANING THE CANOPY

WARNING

DO NOT use abrasive or solvent cleaners on the canopy and especially NOT on the window panels - use only mild detergents.

- Use a soft brush to remove dust and flaking dirt from the canopy (not the windows), prior to washing.
- Use a mild soap and water solution to soften encrusted dirt and remove stains, before rinsing the canopy with clean water.
- Never use spirit, gasoline, or chlorine based cleaning agents, or wash/wax compounds to clean the canopy and windows.
- Never use an automatic car wash, or a high pressure hose.

NOTE: *In wet and muddy driving conditions, it is possible for dirt to collect beneath the leading edge of the canopy, where it fits against the windscreen, this may cause staining of the canopy fabric. Remove the canopy from time to time and wash the affected area.*

Window panels

WARNING

The window panels are susceptible from the effects of dirt and grit. For this reason, it is important to wash them frequently.

- DO NOT use brushes, solvents, gasoline or cleaners on the window panels and DO NOT wipe them when they are dry.
- Wash the windows with a clean, grit free sponge or cloth and a mixture of a mild dishwashing detergent and water.
- Take care when clearing ice or snow from the window panels, as they are easily scratched and could crack at low temperatures.

Window panel storage

- Always clean the window panels before storing.
- Store the window panels flat, separated by the internal compartments, in the window stowage bag provided.
- Once the window panels are stored, DO NOT place anything on top of the stowage bag and DO NOT keep the bag in direct sunlight (this may permanently damage the window panels).
- Minor distortion of the windows which may occur during storage, should disappear after refitting to the vehicle and exposure to direct sunlight.
- DO NOT roll up the window panels in cold weather, they become stiff and may crack.

Ancillary equipment

Winches

A number of different winches, suited to jobs ranging from vehicle recovery to haulage, can be fitted to your Defender. For further information on the types of winch available and their various uses, contact your Land Rover dealer.

As winch operation will vary considerably on different winch units, it is essential that the manufacturer's operating instructions are understood and followed carefully.

Winch safety

WARNING

If used incorrectly, winches can be extremely dangerous.

ALWAYS follow the manufacturer's operating instructions carefully.

NEVER stand near, or astride a winching cable whilst it is under tension.

ALWAYS wear protective gloves when handling winching cables.

In addition;

- DO NOT attempt to continue winching if the winch has stalled due to overloading.
- Inspect the winch and cable regularly - ALWAYS have worn or damaged parts replaced immediately.
- Only use recommended replacement parts of the same specification as the original equipment - failure to do so, may not only damage the winch, but may cause serious personal injury.

After winching

Whilst wearing thick, protective gloves, clean and lubricate the cable with a recommended cable lubricant. For further information, consult your Land Rover dealer.

WARNING

NEVER allow a cable to kink, coil or overlap.

SECTION 4

Owner maintenance

The long-term safety, reliability and performance of your vehicle will depend very largely on how well it is maintained.

Maintenance is the owner's responsibility and it is ESSENTIAL that all routine services are carried out by a Land Rover dealer at the specified intervals. These are shown in the Passport to Service, included in the literature pack. The Passport to Service also provides spaces for your dealer to record the completion of each service, as and when it is carried out, thus creating a valuable and comprehensive record of the maintenance history of your vehicle.

This section of the handbook includes information to assist the owner carry out those daily, weekly and monthly checks that are also necessary to ensure safe, reliable motoring.

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Hood opening	74
Engine compartment	75
Tyres	82
Washer jets & wiper blades	84
Battery	85
Wheel changing	87
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Cleaning & vehicle care	101

Owner maintenance

OWNER MAINTENANCE

In addition to the routine services, which should be carried out by your Land Rover dealer at the intervals shown in the Passport to Service, a number of simple checks (listed below) must be carried out by the owner or driver on a regular basis.

These are fully described on the pages that follow.

Daily checks

- Operation of lights, horn, direction indicators, wipers, washers and warning lights.
- Operation of seat belts and brakes.
- Look for deposits on the garage floor which may indicate a fluid leak.

Weekly checks

These should be carried out at least every 250 miles or 400 km.

- Engine oil level.
- Cooling system level.
- Screen washer reservoir level.
- Condition and pressure of tyres.

Monthly checks

- Brake fluid level.
- Power steering fluid level.
- Automatic gearbox oil level.

All fluid specifications and capacities are shown in '*General data*'.

WARNING

If brake pedal travel is unusually long, or if there is any evident loss of brake fluid, contact your dealer immediately.

Any significant or sudden drop in fluid levels, or uneven tyre wear, should be reported to a Land Rover dealer without delay.

IMPORTANT INFORMATION

Special operating conditions

When a vehicle is operated in extremely arduous conditions, or on dusty, wet or muddy terrain, more frequent attention must be paid to servicing requirements.

For example; if your vehicle experiences deep wading conditions, even DAILY servicing could be necessary to ensure the continued safe and reliable operation of the vehicle.

Contact a Land Rover dealer for advice.

Owner maintenance

Planned maintenance

Regular systematic maintenance is the key to ensuring the continued reliability and efficiency of your vehicle.

The routine maintenance requirements for your vehicle, are shown in the Passport to Service. Most of this necessary workshop maintenance requires specialised knowledge and equipment and should preferably be entrusted to your Land Rover dealer.

Emission control

Your vehicle is fitted with various items of emission and evaporative control equipment, designed to meet specific territorial requirements.

You should be aware that unauthorised replacement, modification or tampering with this equipment by an owner or repair shop, may be unlawful and subject to legal penalties.

In addition, engine settings must not be tampered with. These have been established, to ensure that your vehicle complies with stringent exhaust emission regulations. Incorrect engine settings may adversely affect exhaust emissions, engine performance and fuel consumption, as well as causing high temperatures, which will result in damage to the catalytic converter and the vehicle.

While Land Rover North America Inc. maintains that an authorised Land Rover dealer is best equipped to carry out repairs and maintenance on the emission control system, such work may be carried out by any competent automotive repair shop or individual using certified parts.

Road testing on dynamometers (‘rolling roads’)

WARNING

Because your vehicle is equipped with permanent four-wheel drive, it is essential that any dynamometer testing is carried out ONLY by a qualified person familiar with the dynamometer testing and safety procedures, practised by Land Rover dealers. Contact your Land Rover dealer for further information.

Owner maintenance

SAFETY IN THE GARAGE

Whenever you carry out maintenance on your vehicle, the following safety precautions should be observed at all times.

- ALWAYS keep hands, tools and items of clothing, clear of all drive belts and pulleys.
- DO NOT touch exhaust or cooling system components until they are cool.
- DO NOT touch electrical leads or components with the starter switch turned on.
- NEVER leave the engine running in an unventilated area - exhaust gases are poisonous and contain carbon monoxide, which can cause unconsciousness and may even be fatal.
- DO NOT work beneath the vehicle, with the lifting jack as the only means of support.
- Ensure sparks and open flame are kept away from the engine and battery compartments.

WARNING

Remember; cooling fans and air conditioning system condenser fans (if fitted), may continue to operate after the engine is switched off. Always wait until the fans have completely stopped moving, before working in the engine compartment.

Poisonous liquids

Most liquids and lubricants used in motor vehicles are poisonous and should not be consumed, or brought into contact with open wounds. These include: battery acid, anti-freeze, brake and power steering fluid, as well as gasoline, engine oil and windscreen washer additives.

For your own safety, ALWAYS read and obey all instructions printed on labels and containers.

Used engine oil

Prolonged contact with engine oil may cause serious skin disorders, including dermatitis and skin cancer. ALWAYS wash thoroughly after contact.

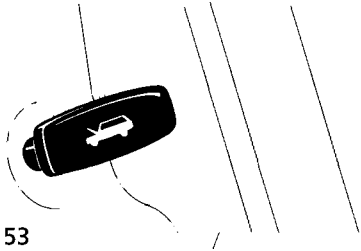
It is illegal to pollute drains, water courses or soil with toxic chemicals such as used engine oil. ALWAYS dispose of vehicle liquids and lubricants, at authorised waste disposal sites or at garages which provide facilities for the receipt of used engine oil and toxic chemicals. If in doubt, contact your Local Authority for advice.

PROTECT THE ENVIRONMENT!

Hood opening

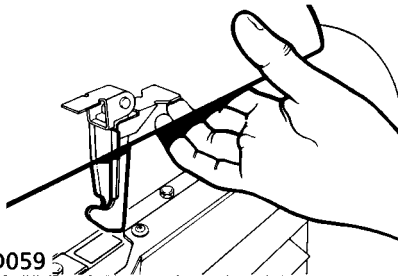
WARNING

Ensure the wipers are switched off and have returned to the parked position before opening the hood.



D153

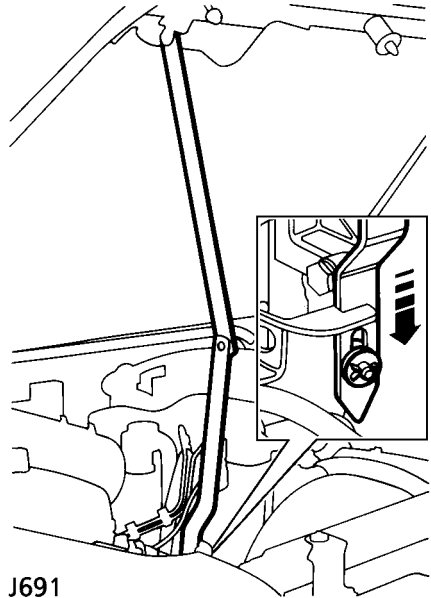
Pull the hood release handle.



D059

Lift the safety catch lever (as illustration) and raise the hood.

Scissor action stay



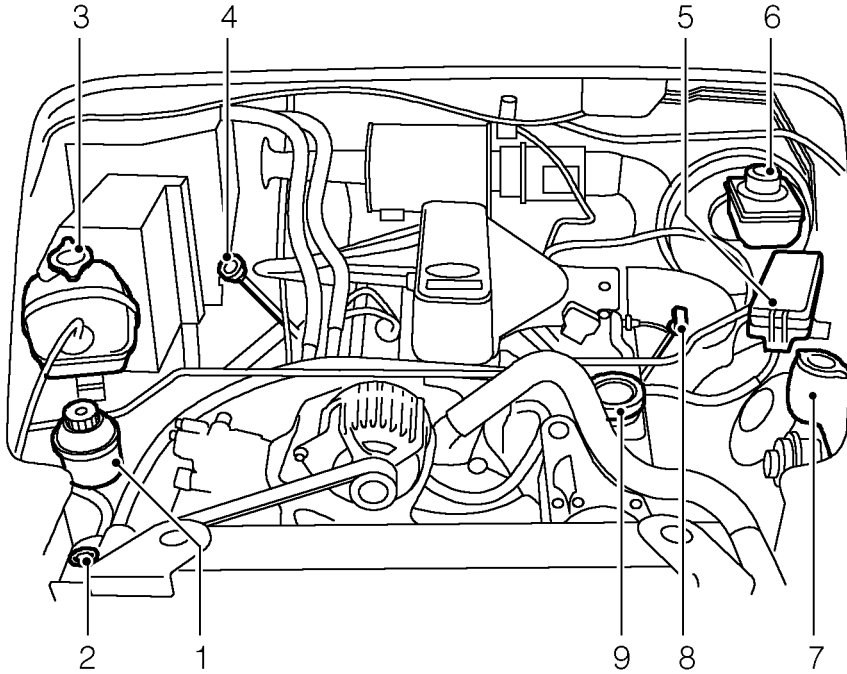
J691

Raise the hood until the stay fully extends. Release the hood, ensuring that the stay locks into position.

Closing the hood

After closing the hood, check that the lock is fully engaged by attempting to lift the front edge of the hood. This should be free from all movement.

Engine compartment



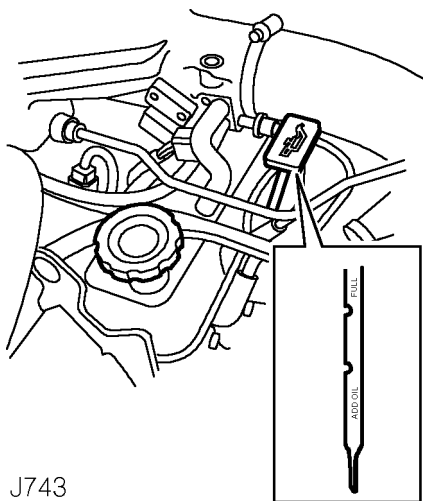
J742

1. Power steering reservoir
2. Radiator filler cap
3. Cooling system reservoir
4. Automatic gearbox dipstick
5. Engine compartment fuse box
6. Brake fluid reservoir
7. Washer reservoir
8. Engine oil dipstick
9. Engine oil filler cap

WARNING

Ensure that sparks and open flame are kept away from the engine compartment.

Engine compartment



J743

ENGINE OIL LEVEL-CHECK & TOP-UP

Check the oil level at least every 250 miles (400 km) (or daily in arduous operating conditions), when the engine is HOT and with the vehicle resting on level ground.

Switch off the engine and let the vehicle stand for five minutes to allow the oil to drain back into the sump. Withdraw the dipstick and wipe the blade clean, then fully reinsert the dipstick and withdraw again to check the level, which should NEVER be allowed to fall below the lower mark on the dipstick.

To top-up, unscrew the oil filler cap and add oil to maintain the level between the UPPER and LOWER marks on the dipstick.

DO NOT OVERFILL!

As a general guide, if the level on the dipstick:

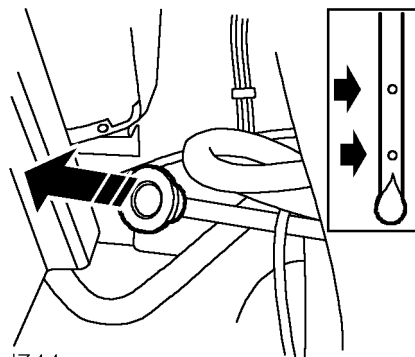
- is nearer to the upper mark than the lower, add no oil.
- is nearer to the lower mark than the upper, add half a litre of oil.
- is below the lower mark, add one litre of oil and re-check the level after a further five minutes.

NOTE: If it is necessary to check the oil level when the engine is cold, DO NOT start the engine. Follow the procedure detailed above, but re-check the oil level as soon as the engine has reached its normal operating temperature.

Oil specifications

It is essential to use an oil suitable for the climatic conditions in which the vehicle is to be operated. Precise specifications are shown in 'General data'. If in doubt, contact your Land Rover dealer.

Engine compartment



J744

AUTOMATIC GEARBOX FLUID LEVEL CHECK & TOP-UP

The automatic gearbox fluid must only be checked when the engine and gearbox are cold (see 'Note' below).

Ensure the vehicle is resting on level ground with the parking brake applied, then start the engine and select 'N' (neutral) .

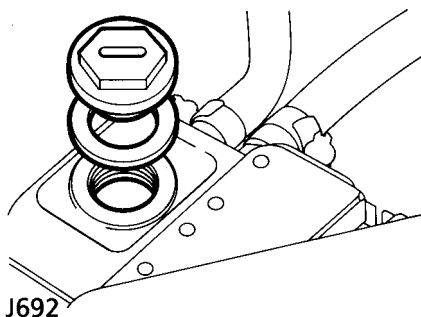
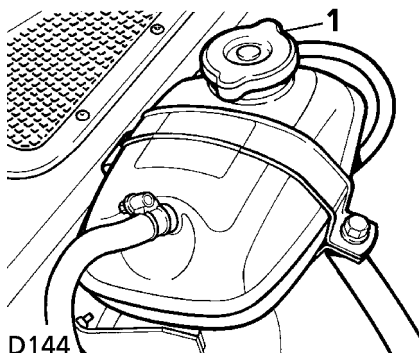
With the engine running, withdraw the dipstick from the filler tube and wipe the blade clean. Reinsert the dipstick fully and withdraw again to check the level. Top-up to maintain the level between the UPPER and LOWER markings on the dipstick, with a fluid meeting the minimum specification defined in 'General data'.

NOTE: In extreme ambient temperatures, the level of fluid showing on the dipstick will vary. To ensure an accurate reading, the level should be checked at an ambient temperature of 68°F (20°C).

DO NOT OVERFILL!

Engine compartment

COOLING SYSTEM TOP-UP



WARNING

NEVER remove the filler cap (1), or radiator filler plug, when the engine is hot - escaping steam or scalding water could cause serious injury.

The coolant level in the reservoir should be checked at least weekly (more frequently in high mileage or arduous operating conditions). Always check the level **WHEN THE SYSTEM IS COLD.**

Unscrew the filler cap and plug slowly, allowing the pressure to escape before removing completely.

Never run the engine without coolant.

As well as removing the reservoir cap (1), carefully unscrew the radiator filler plug, allowing pressure to escape before removing completely.

Top the coolant reservoir and the radiator up, if necessary, with a 50% mixture of anti-freeze and water to maintain the level at approximately 0.5 in (12 mm) below the radiator filler neck and up to the level indicator in the coolant reservoir. Ensure the filler cap and plug are tightened fully after top-up is completed.

DO NOT overfill. This may result in damage to the radiator.

If the level has fallen appreciably, suspect leakage or overheating and arrange for your dealer to examine your vehicle.

Engine compartment

Anti-freeze

Anti-freeze contains important corrosion inhibitors. Ensure the 50% anti-freeze/water solution is maintained and topped up all year round (not just in cold conditions). Failure to do so may cause corrosion of the radiator and engine components.

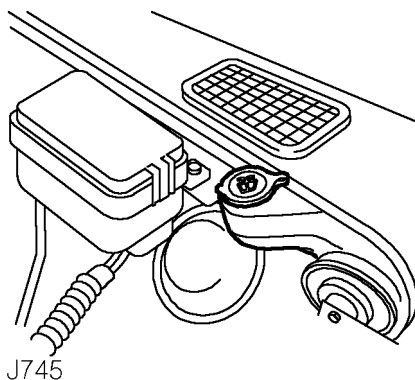
Use an ethylene glycol based anti-freeze (containing no methanol), with non-phosphate corrosion inhibitors, suitable for use in aluminium engines. The specific gravity of a 50% anti-freeze solution at 68° F (20° C), is 1.075 and protects against frost down to -33° F (-36° C).

WARNING

Prevent anti-freeze coming in contact with the skin or eyes. If this occurs, rinse immediately with plenty of water.

Anti-freeze will damage painted surfaces.

NEVER top-up with salt water. Even when travelling in territories where the water supply contains salt, always ensure you carry a supply of fresh (rain or distilled) water.



WINDSCREEN WASHER TOP-UP

The windscreen washer reservoir also supplies the rear screen (if fitted).

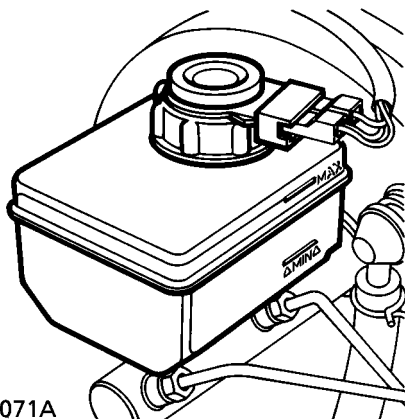
Check the reservoir level and top-up with a mixture of water and an approved screen washer solvent, to approximately 1 in (25 mm) below the bottom of the filler neck. In cold weather, to prevent freezing, use a screen washer solvent containing isopropanol.

Operate the washer switches to check that the nozzles are clear and properly directed.

WARNING

DO NOT use an anti-freeze solution in the washer reservoir. Anti-freeze will damage painted surfaces.

Engine compartment



D071A

WARNING

Contact your dealer immediately if brake travel is unusually long, or if there is any appreciable drop in brake fluid.

BRAKE FLUID CHECK

The fluid level will fall slightly during use, as a result of brake pad wear, but should not be allowed to fall below the 'MIN' mark. Any substantial drop in fluid indicates a leak in the system, in which case the vehicle must NOT be driven and you should contact your dealer.

With the vehicle on level ground, check the fluid level at least every week (more frequently in high mileage or arduous operating conditions). Check the level visually through the side of the transparent container, without removing the filler cap.

Topping-up

Wipe the filler cap clean before removing, to prevent dirt from entering the reservoir, then top up to the 'MAX' mark using *FMVSS 116 DOT 4* fluid.

Use only new fluid from an airtight container (old fluid from opened containers, or fluid previously bled from the system must NOT be used).

DO NOT OVERFILL!

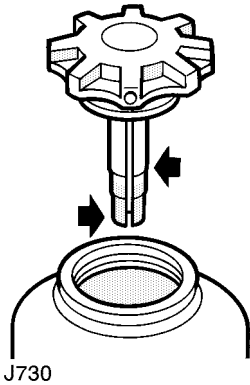
WARNING

DO NOT drive the vehicle with the fluid level below the 'MIN' mark.

Brake fluid will damage painted surfaces; soak up any spillage with an absorbant cloth immediately and wash the area with a mixture of car shampoo and water.

If brake fluid should come into contact with the skin or eyes, rinse immediately with plenty of water.

Engine compartment



WARNING

DO NOT start the engine if the fluid level has dropped below the dipstick - severe damage to the steering system could result.

POWER STEERING TOP-UP

ONLY check the fluid level with the engine switched off and when the system is cold and ensure that the steering wheel is not turned after stopping the engine.

Wipe the filler cap to prevent dirt from entering the reservoir.

Remove the filler cap and, using a lint-free cloth, wipe the dipstick clean. Refit the cap fully and remove it again to check the fluid level. Ensure the fluid level is between the UPPER mark and the end of the dipstick. If necessary, top up with a fluid meeting *Dexron III* specification, ensuring no dirt enters the reservoir.

DO NOT fill above the UPPER mark on the dipstick.

WARNING

Never drive your vehicle if the tyres are badly worn, cut or damaged, or if the pressures are incorrect.

Incorrectly inflated tyres wear rapidly and seriously affect the vehicle's safety and road handling characteristics.

Caring for your tyres

Always drive with consideration for the condition of the tyres and frequently inspect the tread and side walls for signs of distortion or damage (in particular, look for lumps, cuts and bulges).

Tyre pressures

Tyre pressures should be checked at least once a week with normal road use, but should be checked DAILY if the vehicle is used off-road.

Check the pressures - including the spare - when the tyres are cold (air pressure naturally increases in warm tyres). The recommended pressures are shown in 'General data'.

WARNING

If the vehicle has been parked in strong sunlight, or is used in high ambient temperatures, DO NOT reduce tyre pressures; instead, move the vehicle into shade and allow the tyres to cool before checking.

Tyre wear

Some tyres fitted as original equipment, have wear indicators moulded into the tread pattern. When the tread has worn down to 1/16 in (1.6 mm), the indicators start appearing at the surface of the tread pattern, producing the effect of a continuous band of rubber across the width of the tyre.

A tyre MUST be replaced as soon as an indicator band becomes visible, or the tread depth reaches the minimum permitted by legislation.

Tread depth must be checked regularly (at every maintenance service, or more frequently). Always replace a tyre before the tread reaches a remaining depth of 1/16 in (1.6 mm). DO NOT drive with tyres worn to this limit, the safety of the vehicle and its occupants will be adversely affected.

NOTE: *After off-road use, check to make sure there are no lumps or bulges in the tyres or exposure of the ply or cord structure.*

Valve caps

Keep the valve caps screwed down firmly to prevent dirt from entering the valve.

Replacement tyres

Wheel rims and tyres are matched to suit the handling characteristics of the vehicle. For safety, ALWAYS check that replacement tyres comply with the manufacturer's original specification and that the load rating shown on the side wall is the same as that of the original equipment. Contact your Land Rover dealer for further information or assistance.

Tyres

WARNING

ALWAYS use the same make and type of radial-ply tyres front and rear. DO NOT use bias-ply tyres, or interchange tyres from front to rear.

- *If the wheel is marked 'TUBED', an inner tube MUST be fitted, even with a tubeless tyre.*
 - *If the wheel is marked 'TUBELESS', an inner tube must NOT be fitted.*
-

NOTE: *Tyre sizes and pressures are shown in 'General data'.*

WARNING

Do not replace wheels with any type other than genuine Land Rover parts.

Wheels and tyres are designed for both off-road and on-road use and have a very important influence upon the correct operation of the suspension system and vehicle handling.

Alternative wheels which do not meet original equipment specifications should not be fitted.

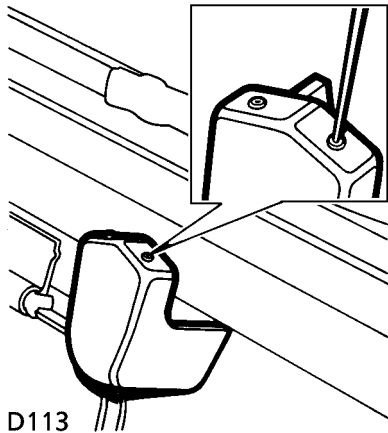
Snow chains

WARNING

DO NOT fit snow chains - this could damage the vehicle.

For more information or assistance, consult your Land Rover dealer.

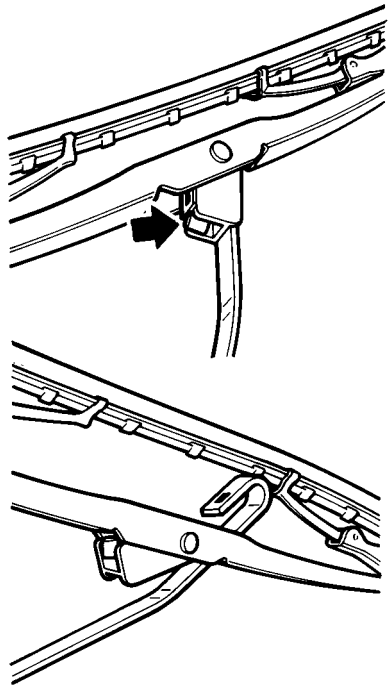
Washer jets & wiper blades



D113

WASHER JETS

To adjust a washer jet, insert a needle into the jet orifice (see inset) and lever gently to position the jet.



D096

WIPER BLADE REPLACEMENT

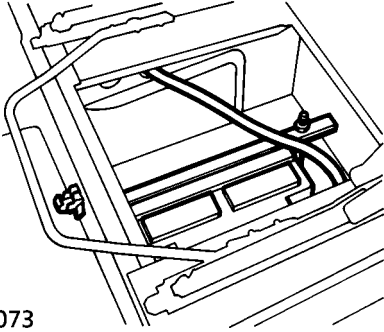
To renew a front or rear wiper blade, lift the wiper arm away from the screen, press the retaining clip (arrowed), push the blade away from the arm and then unhook the wiper blade.

Locate the new blade assembly on the arm, hook it to the swivel bracket and push into engagement until the blade is retained by the clip.

Always fit wiper blades that are identical to the original specification.

NOTE: Before renewing the rear wiper blade, it is necessary to remove the spare wheel from its mounting position on the rear door.

Battery



D073

The battery is located underneath the left-hand front seat. Pull up the front of the seat base to release it from its retaining clips and pull it forward. Release the buckle on the front of the battery compartment and slide off the lid.

When refitting the seat base, insert the rear of the base first and then push down firmly on the front to re-engage the retaining clips - ENSURE the seat base is secure before driving.

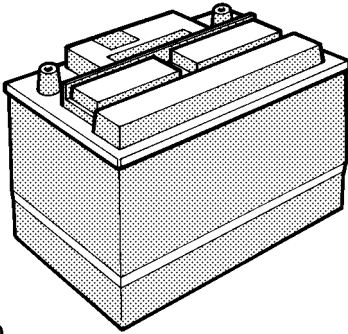
WARNING

Batteries contain sulphuric acid. If the acid comes in contact with the eyes or skin, wash immediately with cold water and seek medical advice.

During normal operation, batteries emit explosive hydrogen gas - ensure sparks and open flame are kept away from the battery compartment.

To reduce the risk of a short circuit, remove all metal wrist bands and jewellery before working in the battery compartment and NEVER allow the battery terminals or vehicle leads, to make contact with tools or metal parts of the vehicle.

Battery



J480

The battery fitted to your vehicle requires minimal attention, as follows:

- In temperate climates, check the electrolyte level once every 3 years. In hot climates, check the level annually.
- Occasionally wipe the battery casing, to remove dirt and grease.
- Keep the battery terminals clean and free from corrosion, by occasionally smearing them with petroleum jelly.

Checking the electrolyte level

Gently prise off the vent covers (or unscrew if vent plugs are fitted) and inspect the electrolyte level of each cell. This should be no lower than 0.04 in (1 mm) above the top of the plates. If necessary, top up with distilled water to a maximum of 0.12 in (3 mm) above the plates.

Battery removal and replacement

ALWAYS Turn the starter switch to position '0', switch off all electrical equipment and remove the key, before disconnecting the battery.

ALWAYS disconnect the negative ('-') terminal first. When replacing, connect the positive ('+') terminal first.

WARNING

To avoid damaging the vehicle's electrical system, ensure correct polarity when refitting the battery.

ONLY fit a replacement battery of the same type and specification as the original. Other batteries may vary in size and have different terminal positions, capable of creating a potential fire hazard if the terminals or leads were to come into contact with the battery clamp assembly.

DO NOT use a high speed battery charger as a starting aid.

DO NOT let the engine run without the battery connected.

Cold climates

Where ambient temperatures are consistently below freezing point, a heater should be used to keep the battery warm while the vehicle is not in use. Consult your Land Rover dealer for recommendations.

Battery

Battery charging

Batteries generate explosive gases, contain corrosive acid and supply levels of electric current high enough to cause serious burns. Before charging, ensure the battery is properly topped up and ALWAYS observe the following precautions while charging the battery:

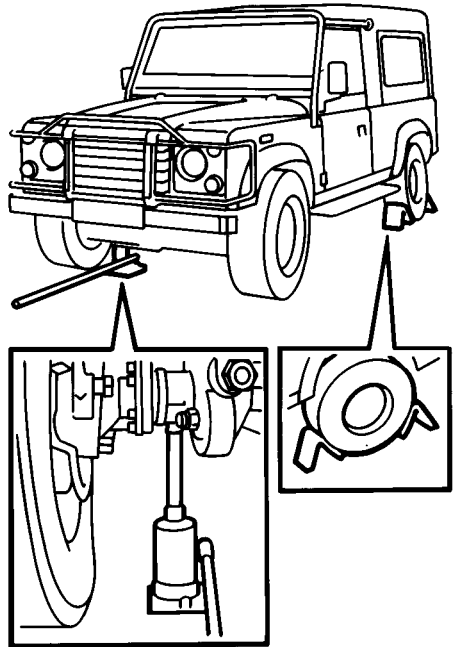
- Always remove the battery from the vehicle.
- Make sure the battery charger is disconnected from its power supply, before connecting the leads to the battery terminals.
- Make sure the charging leads are securely clamped, before switching on the charger, and DO NOT move the clamps while the charger is switched on.
- Shield your eyes, or avoid leaning over the battery.
- Keep the area around the top of the battery well ventilated.
- Keep open flame clear of the battery (batteries emit inflammable hydrogen during and after charging).
- When charging is complete, switch off the charger before disconnecting the charging leads, and then leave the battery for an hour BEFORE reconnection to the vehicle.

Wheel changing

IMPORTANT INFORMATION

Before jacking the vehicle, always observe the following precautions!

- Park your vehicle away from the thoroughfare, and make your passengers wait in a safe area AWAY from the vehicle.
- Switch on the hazard warning lights to alert other road users.
- ALWAYS engage the differential lock before jacking (warning light on fascia illuminates).
- Apply the parking brake and select 'P' in the main gear box and select 'L' in the transfer box. Turn off the starter switch and remove the key.
- NEVER jack the vehicle with passengers inside, or with a caravan or trailer connected!
- NEVER work beneath the vehicle with the jack as the only means of support. The jack is designed for wheel changing only!



D133

WARNING

Always chock the front and back of the wheel diagonally opposite the one to be removed.

Using the Wheel Chock

WARNING

Before raising the vehicle, it is ESSENTIAL to chock one of the road wheels; the parking brake acts on the transmission, not on the rear wheels, and therefore may not hold the vehicle when raised.

NOTE: The bottle jack and wheel chocks are stowed in a compartment under the left-hand front seat (see 'Battery' for details of access). The jack handle and tools are stowed in a tool bag behind the front seats.

WARNING

Batteries emit explosive hydrogen gas; ensure that sparks and naked lights are kept away from the battery compartment.

Wheel changing

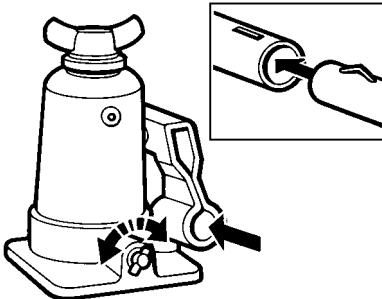
Removing the spare wheel

Remove the nuts securing the spare wheel to the carrier and lift off the wheel.

WARNING

DO NOT use the spare wheel securing nuts in place of the road wheel nuts.

The wheels are extremely heavy. Take care when lifting and particularly when removing the spare wheel from its mounting position on the rear door.



D114

Operating the jack

Slot the jack lever together, ensuring that the spring clip protrudes from the engagement slot where the two parts join (see inset). Close the jack release valve by turning it fully clockwise and insert the lever into the socket where shown. Pump the lever up and down to raise the jack.

To lower the jack, withdraw the lever and slot the notched end over the the the pegs on the release valve. Slowly turn the release valve anti-clockwise, allowing the weight of the vehicle to lower the jack.

WARNING

Ensure the jack is positioned on firm, level ground.

DO NOT use the jack to raise the vehicle, until you have carefully read and understood 'Positioning the jack' later in this section. If in doubt, consult your dealer.

Care must be taken to avoid accidental contact with any underbody parts, especially the hot exhaust system components, likely to cause personal injury during raising or lowering of the vehicle.

Ensure that the space under and around the vehicle is free from obstruction as it is lowered.

Wheel changing

Positioning the jack

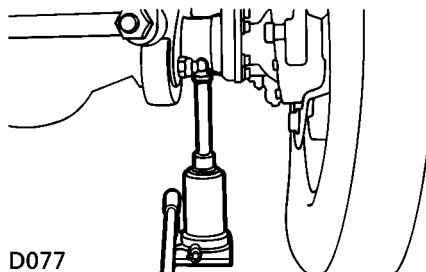
Always position the jack from the front or rear of the vehicle, directly in line with the jacking points.

WARNING

NEVER use the jack from the side of the vehicle.

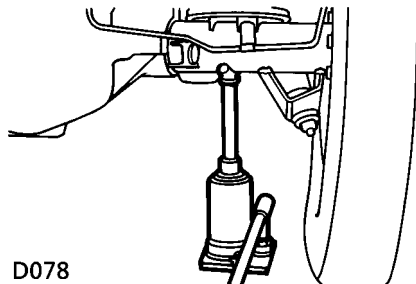
Always use the complete, two piece, jack lever throughout, to minimise any accidental contact with a hot exhaust system.

ONLY jack the vehicle using the jack location points described, or damage to the vehicle could occur.



Front jacking point:

Position the jack so that, when raised, it engages with the front axle casing, immediately below the coil spring. The jack cradle must locate between the flange at the end of the axle casing and the large bracket to which the front suspension members are mounted.



Rear jacking point:

Position the jack so that, when raised, it engages with the rear axle casing, immediately below the coil spring and as close as possible to the shock absorber mounting bracket.

Care of the jack

Occasionally, clean and grease the moving parts (particularly the ram/pillar) to prevent corrosion.

The bottle jack oil level should be checked at normal servicing intervals and if necessary, topped up with an hydraulic oil with a viscosity to BS 4231 grade 32 and ISO proof 32.

To avoid contamination, the bottle jack should always be returned to its fully closed position and must always be stowed upright.

Wheel changing

Changing a wheel

Before raising the vehicle, ensure that all the precautions listed at the beginning of this section have been observed.

Also, ensure that the wheel chock is correctly positioned, as described previously.

- Use the wheel nut wrench to slacken the wheel nuts half a turn counter-clockwise.
- Raise the vehicle until the tyre is clear of the ground, and remove the wheel nuts and wheel (DO NOT damage the surface of alloy wheels by placing them face down on the road).
- Lightly oil or grease the wheel studs, to assist in wheel replacement, ensuring that no oil or grease comes into contact with the brake components.
- On vehicles fitted with alloy wheels, lightly oil or grease (using an approved anti-seize compound) the wheel mounting spigot, to minimise the tendency for adhesion between the wheel and the spigot. Ensure that no oil or compound comes into contact with the brake components. If, due to an emergency situation, this treatment is not practicable; refit the spare wheel for the time being, but remove and treat the wheel at the earliest opportunity.
- Fit the spare wheel and lightly tighten the wheel nuts, ensuring they are firmly seated. DO NOT fully tighten whilst the tyre is clear of the ground.

WARNING

When fitting a wheel, ensure that the mating faces of the hub and wheel are clean and free from corrosion - an accumulation of dirt or corrosion could cause the wheel nuts to become loose and result in an accident.

- Lower the vehicle and remove the jack and wheel chock.
- Fully tighten the wheel nuts. DO NOT OVERTIGHTEN by using foot pressure or extension bars on the wheel nut wrench, as this could overstress the wheel studs.
- REMEMBER to disengage the differential lock and change to 'H' (high range) before driving.
- Finally, check the tyre pressure and wheel nut torque at the earliest opportunity, see 'General data'.

WARNING

After wheel changing, always secure tools, chock, jack and spare wheel in their correct storage positions.

Fuses

Fuses are simple circuit breakers which protect electrical equipment, by preventing the electrical circuits from being overloaded.

Always remove the starter key and switch off the affected circuit before removing a fuse.

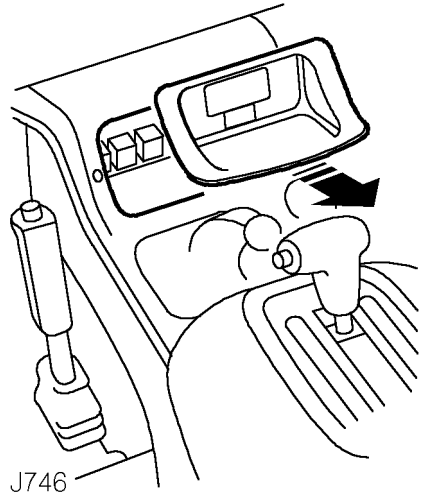
Always fit a new fuse of the same rating. If the replacement fuse fails immediately, contact your local Land Rover dealer and have the circuit checked.

WARNING

Fit only replacement fuses of the same rating and type. Always rectify the cause of a failure before replacing a fuse. Seek qualified assistance if necessary.

Fuses are colour coded to help identify their amperage, as follows:

TAN	5
BROWN	7.5
RED	10
BLUE	15
YELLOW	20
GREEN	30



The main fuse box is located behind an access panel in front of the transfer box gear lever. Pull the panel away from the console to gain access to the fuses. The fuse ratings and the circuits they protect are listed on the following page.

After changing a fuse, ensure the access panel is firmly secured by the velcro fixings.

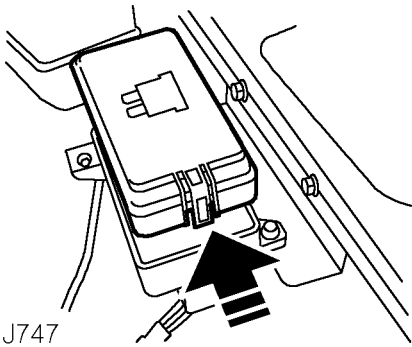
Fuses

MAIN FUSE BOX

Fuse No.	Value (amps)	Electrical circuit
1	15	Warning lights, instruments, headlight relay
2	10	Radio/cassette player, gearshift
3	5	Diagnostics
4	15	Heater
5	7.5	Radio/cassette player
6	15	Radio/cassette player
7	7.5	Headlight - RH, dipped beam
8	7.5	Headlight - LH, dipped beam
9	7.5	Headlight - RH, main beam
10	7.5	Headlight - LH, main beam
11	5	Side lights - LH
12	5	Side lights - RH
13	20	Auxiliary
14	20	Auxiliary
15	30	Air conditioning
16	15	Air conditioning
17	15	Stop lights, rear wash/wipe, alarm
18	15	Front wipers, rough road detectors
19	15	Heater
20	20	Engine

Fuses

The circuits protected and their ratings are as follows:



Value (amps)	Electrical circuit
30	Chassis
20	Clock, horn
30	Diagnostics
20	Spare
30	Hazard lights
15	Fuel pump
30	Fuel injection

ENGINE COMPARTMENT FUSE BOX

A second fuse box is located on the left side of the engine compartment, adjacent to the brake fluid reservoir. Press the catch (arrowed) and lift the lid to open.

The circuits protected and their locations are shown on a printed diagram on the inside of the fuse box cover and are also listed below.

NOTE: Six main circuit fuses are also located in the engine compartment fuse box. If a fault is suspected in one of the main circuit fuses, contact your Land Rover dealer.

WARNING

Fit only replacement fuses of the same rating and type. Always rectify the cause of a failure before replacing a fuse. Seek qualified assistance if necessary.

Bulb replacement

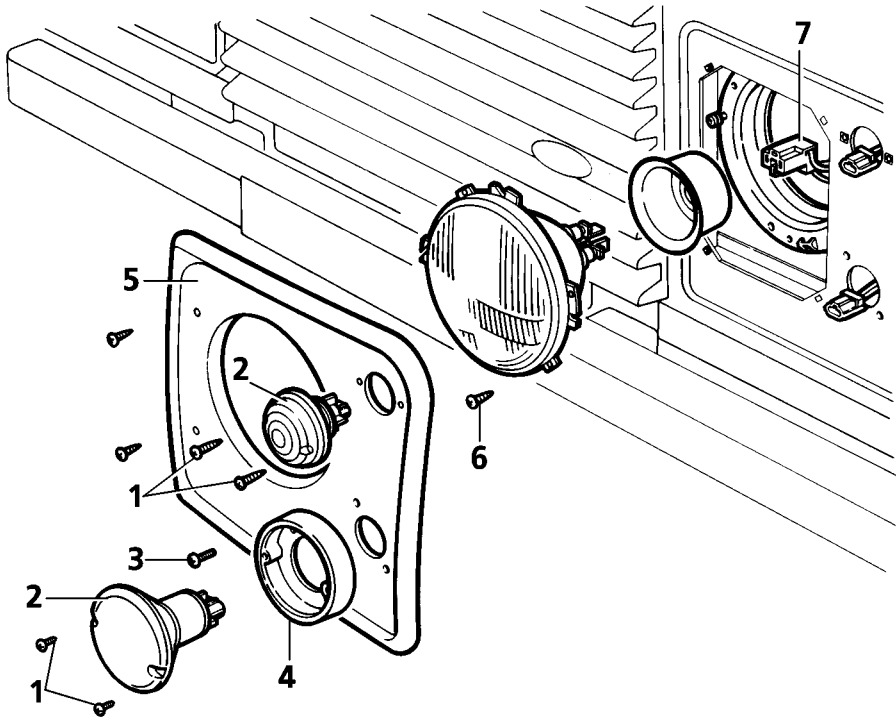
REPLACEMENT BULBS	Watts
Headlights	60/55 (Halogen sealed beam)
Parking lights	5
Side marker lights	3.5
Stop lights	21
Tail lights	5
Direction indicator lights	21
Number plate lights	4
Reversing lights	21
Interior lights	10
Warning lights	1.2
Instrument illumination	2
High level stop light (soft top)	5
High level stop light (station wagon)	21

NOTE: All bulbs must be rated at 12 volts.

IMPORTANT INFORMATION

Before replacing a bulb, always switch off the starter switch and appropriate lighting switch to prevent any possibility of a short circuit. Only use new bulbs of the same type and with the same specification.

Bulb replacement



P0319

HEADLIGHT UNIT

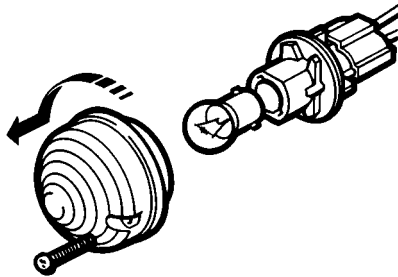
Light unit removal

- Remove the screws (1) retaining the parking light and direction indicator light (2), release them forward and disconnect the plugs.
- Remove the two screws (3) that secure the direction indicator light boss (4).
- Remove the screws retaining the headlight surround (5).
- Remove the headlight retaining screw (6), pull the headlight forward to disengage and lift out the headlight.
- Detach the multi-plug (7), remove the rubber cover and replace the halogen unit.
- Replace the rubber cover, pressing the centre firmly to seal around the electrical contacts of the bulb, then refit the multi-plug.

WARNING

ALWAYS fit headlight bulbs and light units with the same Watt value as the original specification (see 'Replacement bulbs').

Bulb replacement



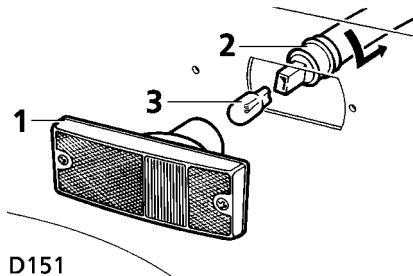
D087

Parking lights

Remove the retaining screws and withdraw the unit.

Twist the lens counter-clockwise to release the bulb unit.

Push and twist the bulb to remove.



D151

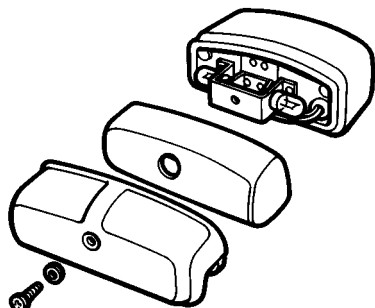
Side marker lights

Remove the retaining screws and withdraw the unit (1) from the wing.

Twist the bulb holder (2) counter-clockwise, to release it from the unit.

Pull out the bulb (3) to replace.

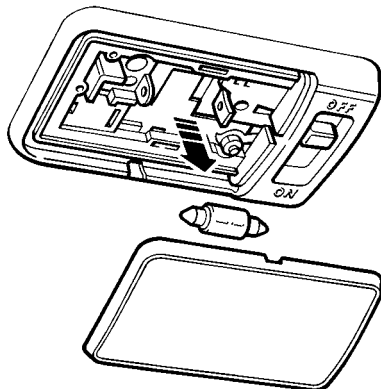
Bulb replacement



D088

Number plate lights

Remove the securing screw, remove the cover and pull out bulb.

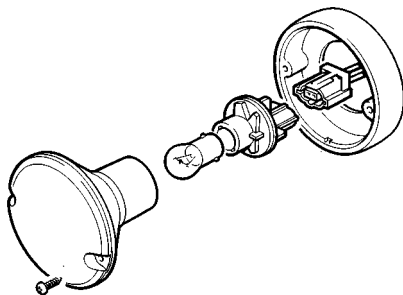


D090

Interior lights

(Station wagons)

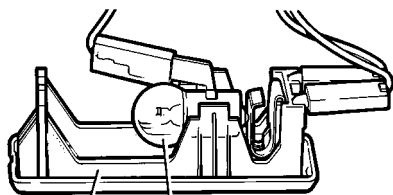
Prise out the lens unit using a flat bladed screw driver and spread the bulb holders to remove the bulb.



D157

Tail light, direction indicators (front and rear), reverse lights

Remove the retaining screws and withdraw the lens, twist counter-clockwise to detach the bulb holder, then push and twist to release the bulb.



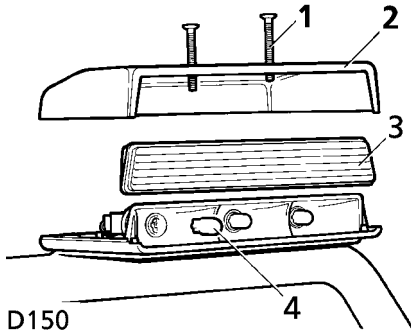
D148 1 2

Interior light

(Soft tops)

Prise out the lens unit (1) using a flat bladed screw driver and remove the bulb (2) from the holder.

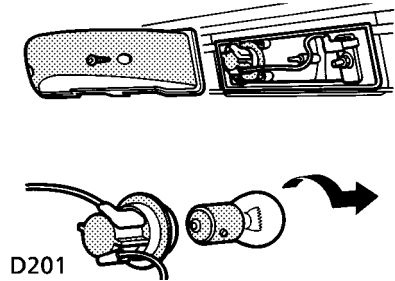
Bulb replacement



High level stop light (Soft tops)

Remove the two screws (1) and remove the top of the unit (2).

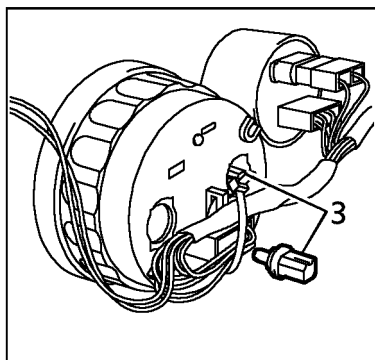
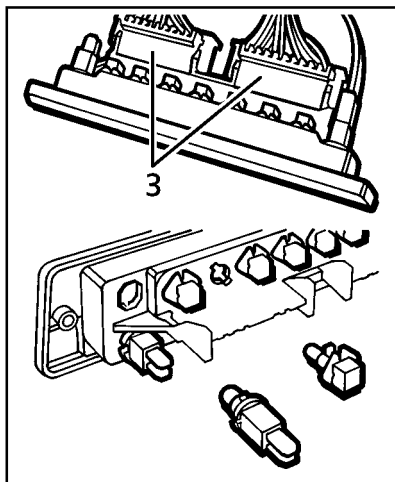
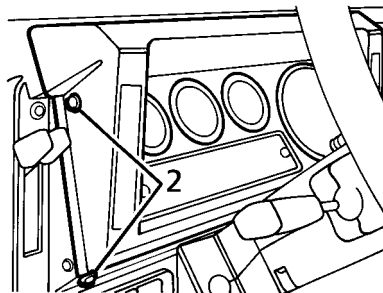
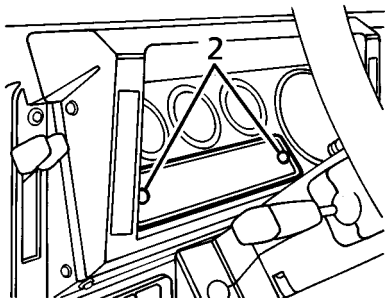
Lift out the lens (3) and pull out the bulbs (4) to replace.



High level stop light (Station wagons)

Remove the screws from the cover and remove the casing. Twist the bulb holder counter-clockwise to remove. Push and twist to release the bulb.

Bulb replacement



D135

J748

Warning lights

Disconnect the battery (see 'Battery removal and replacement').

Remove the screws (2) and withdraw the warning light module from the instrument panel.

Disconnect the appropriate multi-plug (3), twist and pull out the bulb holder and pull out bulb.

NOTE: Remember to reconnect the battery after replacing a bulb.

Instrument illumination lights

Disconnect the battery (see 'Battery removal and replacement').

Remove the four screws (2) and ease the instrument panel out.

If necessary, the speedometer drive cable can be disconnected to improve access.

Twist and pull out the bulb holder (3) and pull out bulb.

NOTE: Remember to reconnect the battery after replacing a bulb.

Cleaning & vehicle care

WASHING YOUR VEHICLE

Wash your vehicle frequently using a sponge and generous quantities of cold or lukewarm water containing a car shampoo. Rinse and dry off with a chamois leather.

- Do not use hot water!
- Do not use detergent soap products or washing-up liquid!

When using a hose, do not direct the jet into the heater air intake ducts, or through the wheel trim apertures onto the brake components, or at the door, window or sunroof (if fitted) seals, where water pressure could penetrate the seals.

WARNING

Some high pressure cleaning systems are sufficiently powerful to penetrate door or window seals and damage rubbing strips and locking mechanisms. Never aim the water jet directly at components that might easily be damaged.

Underbody maintenance

Corrosive materials, used for snow and ice removal and dust control, can collect on underbody parts. If these materials are not removed, accelerated corrosion can occur on underbody parts, such as the frame, floor pan and exhaust system. Regularly flush these materials from the underbody with fresh water. Take care to thoroughly clean any areas where mud and debris can collect.

Similarly, after off-road driving or wading in muddy or salt water conditions, use a hose to wash underbody components and other exposed parts of the vehicle.

Getting rid of tar spots

Use white spirit to remove tar spots and stubborn grease stains from paintwork. Then wash immediately to remove all traces of spirit.

Body protection

After washing, inspect the paintwork for damage. Any stone chips, fractures, or deep scratches in the body work should be repaired promptly. Bare metal can corrode quickly and can develop into major repair expense. Some exterior panels of your vehicle are made of Aluminum, which will not corrode in the same manner as sheet steel. However, any damage should still receive prompt attention. Minor chips and scratches can be repaired with touch up materials, available from your dealer. Larger areas of damage need to be corrected to professional standards immediately.

Occasionally protect the paint surface with an application of car polish.

Glass & mirrors

Clean the inside of the rear window (if fitted) with a soft cloth, to avoid damaging the heating elements. DO NOT scrape the glass or use an abrasive cleaning fluid.

Mirror glass is particularly susceptible to damage - DO NOT use abrasive cleaning compounds or metal scrapers.

Cleaning & vehicle care

LOOKING AFTER THE INTERIOR

WARNING

DO NOT use water to clean the dashboard and fascia area, damage to fuses and switches could occur. Instead, clean sparingly with a damp cloth and approved upholstery cleaner.

Soak up any spilt liquids immediately.

Clean the centre console with a damp cloth and a non-detergent soap. DO NOT use upholstery cleaner. Dry with a clean lint-free cloth.

Clean plastic-faced or cloth covered surfaces and carpets (after sweeping) with diluted upholstery cleaner.

Steering wheel and trim features, should be cleaned with a damp cloth moistened with undiluted upholstery cleaner. Leave for five minutes, and then repeat the operation using a clean, damp cloth. Dry and polish the trim with a dry, lint-free cloth.

NOTE: Avoid flooding any area, but especially around the gear selector lever, and soak up any spillage immediately.

DO NOT use gasoline, detergents, cleaning fluids, solvents, furniture creams or polishes!

Clock and radio

Clean with a dry cloth. DO NOT use cleaning fluids or sprays.

Seat belts

Extend belts, then use warm water and a non-detergent soap to clean. Allow to dry naturally, and do not retract until completely dry.

DO NOT bleach or dye the webbing.

SECTION 5

Workshop maintenance

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Workshop maintenance

WORKSHOP MAINTENANCE

It is recommended that the maintenance procedures covered in this section of the handbook, should only be carried out by qualified personnel in a fully equipped workshop; preferably an authorised Land Rover dealer. However, if the vehicle is being operated in a remote area, where full workshop facilities are not available, some maintenance can be carried out, provided that it is completed in safe conditions by experienced personnel.

WARNING

DO NOT carry out any maintenance in dusty, damp or dirty conditions.

NOTE: *Some of the servicing procedures require specialised knowledge and equipment, and therefore MUST be carried out by a qualified person, familiar with the maintenance and safety procedures practised by Land Rover dealers. These NECESSARY procedures are NOT covered in this handbook and should be referred to a Land Rover dealer.*

Servicing schedules

In normal operating conditions, servicing should be carried out at intervals of 7,500 miles (12,000 km) or every six months, whichever is sooner.

IMPORTANT INFORMATION

Special operating conditions

When a vehicle is operated in extremely arduous conditions, or on dusty, wet or muddy terrain, more frequent attention must be paid to servicing requirements.

For example; if your vehicle experiences deep wading conditions, even DAILY servicing could be necessary to ensure the continued safe and reliable operation of the vehicle.

Contact a Land Rover dealer for advice.

Workshop maintenance

Emission control

Your vehicle is fitted with various items of emission control equipment, designed to meet specific territorial requirements.

You should be aware that unauthorised replacement, modification or tampering with this equipment by an owner or motor vehicle repairer, may be unlawful and subject to legal penalties.

In addition, engine settings must NOT be tampered with. These have been established to ensure that your vehicle complies with stringent exhaust emission regulations. Incorrect engine settings may adversely affect exhaust emissions, engine performance and fuel consumption, as well as causing high temperatures, which will result in damage to the catalytic converter and the vehicle.

Replacement parts

It is essential that only Land Rover parts are used, safety features embodied in the vehicle may be impaired if other, non-approved parts are used. In certain territories, legislation prohibits the fitting of parts not to the manufacturer's specification.

WARNING

The fitting of parts of inferior quality, or the carrying out of non-approved alterations or conversions, may be dangerous and could affect the safety of the vehicle and occupants. It could also invalidate the terms and conditions of the vehicle warranty.

Road testing on dynamometers (‘rolling roads’)

WARNING

Because your vehicle is equipped with permanent four-wheel drive, it is essential that any dynamometer testing is carried out ONLY by a qualified person, familiar with the dynamometer testing and safety procedures practised by Land Rover dealers. Contact your Land Rover dealer for further information.

Workshop maintenance

SAFETY IN THE GARAGE

Whenever you carry out maintenance on your vehicle, the following safety precautions should be observed at all times.

- ALWAYS keep hands, tools and items of clothing clear of all drive belts and pulleys whilst they are in operation.
- DO NOT touch exhaust or cooling system components until they are cool.
- DO NOT touch electrical leads or components with the starter switch turned on.
- NEVER leave the engine running in an unventilated area; exhaust gases are poisonous and contain carbon monoxide, which can cause unconsciousness and can be fatal.
- DO NOT work beneath the vehicle with the lifting jack as the only means of support.
- Ensure sparks and open flame are kept away from the engine and battery compartments.
- DO NOT use any lubricants, solvents or sealants etc, without first reading any warnings and instructions supplied with these substances; they could be harmful if improperly used.

WARNING

Remember, cooling fans and air conditioning system condenser fans (if fitted), may continue to operate after the engine is switched off. Always wait until the fans have completely stopped moving before working in the engine compartment.

Fuel system safety

Fuel vapour is highly flammable and in confined spaces, is also very explosive and toxic. When fuel evaporates, it produces 150 times its own volume in vapour and when mixed with air, becomes an easily ignitable mixture; consequently even a small spillage is very dangerous.

It is recommended that you always have a FOAM, CO₂ GAS, or POWDER type fire extinguisher close at hand when working with fuel or the fuel system.

ALWAYS disconnect the battery negative lead BEFORE carrying out work on the fuel system.

WARNING

It is imperative that the battery is disconnected BEFORE and not during any work on the fuel system, as arcing at the battery terminal could ignite fuel vapour in the atmosphere.

Whenever fuel is being handled, transferred or stored, or when carrying out work on the fuel system, all forms of ignition MUST be extinguished or removed, any lighting being used MUST be flameproof and kept clear of the fuel.

Workshop maintenance

Poisonous liquids

Most liquids and lubricants used in motor vehicles are poisonous and should not be consumed or brought into contact with open wounds. These include; battery acid, anti-freeze, brake and power steering fluid, as well as gasoline, engine oil and windscreen washer additives.

For your own safety, ALWAYS read and obey all instructions printed on labels and containers.

Used engine oil

Prolonged contact with engine oil can cause serious skin disorders, including dermatitis and skin cancer. ALWAYS wash thoroughly after contact.

It is illegal to pollute drains, water courses or soil with toxic chemicals such as used engine oil. ALWAYS dispose of vehicle liquids and lubricants at authorised waste disposal sites, or at garages which provide facilities for the receipt of used engine oil and toxic chemicals. If in doubt, contact your Local Authority for advice.

PROTECT THE ENVIRONMENT!

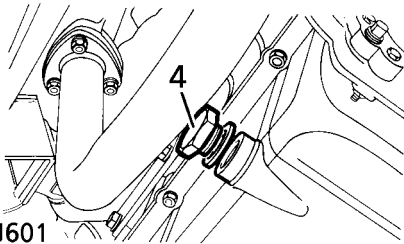
Workshop maintenance

ENGINE OIL RENEWAL

NOTE: For engine oil check & top-up see 'Owner maintenance'.

WARNING

DO NOT attempt to drain the engine sump if the engine has been running for some time, the engine oil will be hot and may cause severe scalding.



With the vehicle resting on firm, level ground, run the engine for a few minutes so that the oil will drain more easily. Turn the starter switch to position '0' and disconnect the battery negative lead.

Remove the oil filler cap and position a suitable container under the oil drain plug (4) to collect the used oil.

Remove the drain plug and its washer and allow the oil to drain completely.

NOTE: If, by necessity, this procedure is being carried out in dusty or sandy conditions, refit the drain plug as soon as the main bulk of the oil has drained.

When the sump has fully drained, clean the draining plug and the surrounding area of the sump and refit with a new copper washer.

Refill the sump with fresh oil of the correct specification (see 'General data'). Refit the filler cap and let the vehicle stand for five minutes to allow the oil to drain back into the sump. Check the oil level using the dipstick (as described in 'Owner maintenance') and top up until the correct level is obtained.

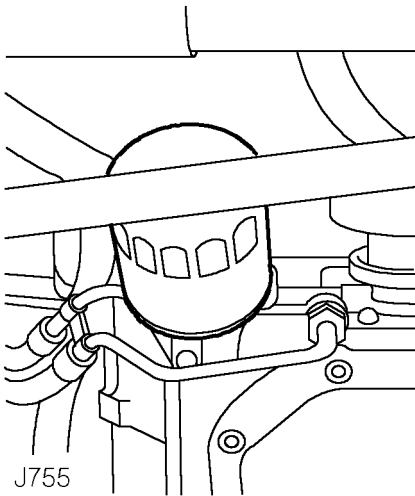
- **DO NOT use oil previously drained from the engine.**
- **DO NOT OVERFILL!**

Workshop maintenance

ENGINE OIL FILTER RENEWAL

To prevent any possibility of air locks in the oil pump, it is recommended that filter renewal is carried out **AFTER** the engine oil has been changed.

To minimise the risk of draining the oil pump, ensure that the oil is at the correct operating level before removing the filter.



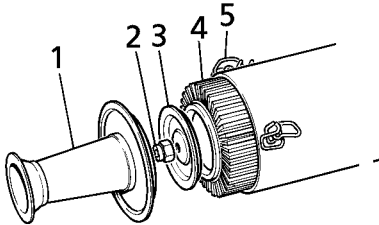
- Turn the starter switch to position '0' and disconnect the battery negative lead.
- Clean the area around the head of the filter.
- Place a suitable container beneath the filter.
- Using a strap wrench, unscrew the filter and discard it safely.
- Half fill the filter and smear the rubber washer of the new filter, with clean engine oil of the correct specification (see '*General data*').
- Screw the filter on clockwise until the rubber washer touches up against the machined face, then tighten a further half turn using hand pressure only. **DO NOT OVERTIGHTEN.**
- Connect the battery negative lead and run the engine at a fast idle for five minutes.
- Check the filter for leaks.

Stop the engine and let the vehicle stand for five minutes to let the oil drain back into the sump. Check the oil level (see '*Owner maintenance*') and top up if necessary.

Workshop maintenance

AIR CLEANER ELEMENT RENEWAL

Engine performance will be seriously affected if the air cleaner element becomes choked with dust and other airborne particles.

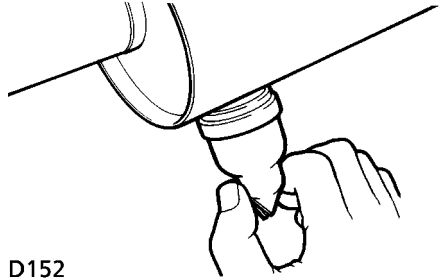


J758

- Release the three clips (5) and remove the inlet tube (1).
- Remove the nut (2) and end plate (3).
- Withdraw the element (4) and discard. DO NOT attempt to clean and re-fit the old element.
- Insert the new element and re-assemble in the reverse of the removal procedure.

Air cleaner dump valve check

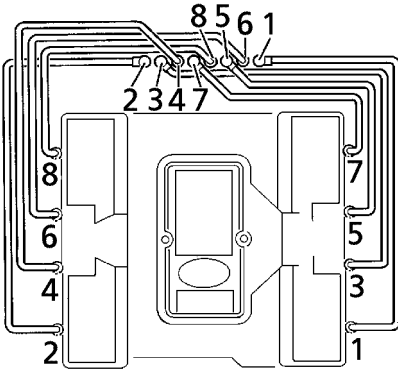
The dump valve is situated on the base of the air cleaner support bracket.



D152

- Squeeze open the dump valve (as illustration) and check that the interior is clean. Renew the valve if perished.

SPARK PLUG CHECK/RENEWAL



J756

IGNITION WIRING & H.T. LEAD CHECK

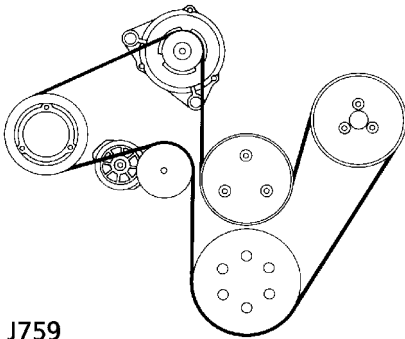
Check the H.T. leads for insulation cracking, or corrosion at end contacts. If the H.T. leads are damaged, replace with new leads of the same specification.

NOTE: Ensure leads are reconnected in the correct order or the engine will misfire.

- Remove the H.T. leads from the spark plugs.
- Remove the plugs using a spark plug socket and ratchet.
- If they are in poor condition, replace with new plugs of the correct specification (see 'General data').
- Set the spark plug gaps to the correct setting (see 'General data').
- Fit the spark plugs and washers - DO NOT OVERTIGHTEN.

NOTE: Fitting incorrect grades of spark plug, may lead to piston overheating and engine failure.

- Refit the H.T. leads in the correct order (as illustration), ensuring that the leads are firmly seated onto the plugs.



J759

DRIVE BELT ARRANGEMENT

1. Air conditioning compressor
2. Automatic tensioner pulley
3. Viscous fan/water pump unit
4. Crankshaft
5. Power steering pump
6. Alternator

DRIVE BELTS

Driving belt tension

The drive belt and all pulleys should be examined regularly for any damage, deterioration or fouling (grit, mud, oil etc). Replace or clean where necessary.

After every off-road session, the drive belt should be inspected for cuts and possible damage caused by stones. If the belt has jumped, reposition it correctly and, if necessary, replace it at the earliest opportunity.

WARNING

Before checking any drive belt; to prevent the possibility of serious injury, disconnect the battery negative lead to prevent the engine from being started.

Workshop maintenance

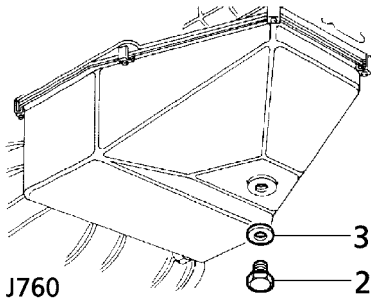
MAIN GEARBOX OIL RENEWAL

WARNING

For safety, DO NOT work underneath the vehicle unless it is safely parked with the wheels chocked, or is supported by heavy duty stands.

Extreme care should be taken when draining gearbox oil, it may be hot and cause severe scalding.

Ensure the vehicle is parked on firm, level ground and chock the wheels. Place a suitable container under the gearbox to catch the used oil.



WARNING

Use only NEW oil - DO NOT use oil previously drained from the system.

- Withdraw the gearbox dipstick, located to the rear of the right hand rocker cover, to assist with oil drainage.
- Remove the drain plug (1) and allow the oil to drain completely.
- Clean and refit the drain plug, using a new sealing washer (2). Tighten the plug to a torque of 10Nm (7.5 lbf/ft).
- Refill the gearbox through the dipstick tube with new oil of the correct specification (see 'General data').
- Refit the dipstick.

Workshop maintenance

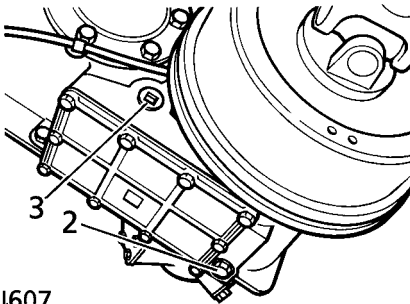
TRANSFER GEARBOX OIL RENEWAL

WARNING

For safety, DO NOT work underneath the vehicle unless it is safely parked with the wheels chocked, or is supported by heavy duty stands.

Extreme care should be taken when draining gearbox oil, it may be hot and cause severe scalding.

Ensure the vehicle is parked on firm, level ground and chock the wheels. Place a suitable container under the gearbox to catch the used oil.



J607

- Clean the area surrounding the drain plug (2) and filler level (3) plug, to prevent contamination of the gearbox.
- Remove the drain plug (2) and allow the oil to drain completely.

- Clean and refit the plug with a new washer. Tighten to a torque of 23 lbf/ft (30 Nm).
- Remove the filler level plug (3) and inject the correct grade of oil (see 'General data') until it begins to run from the hole.

WARNING

Use only NEW oil - DO NOT use oil previously drained from the system.

- Clean and refit the filler level plug. Tighten to a torque of 23 lbf/ft (30 Nm).
- Wipe any surplus oil from the area and remove the wheel chocks.

Workshop maintenance

FRONT/REAR AXLE OIL RENEWAL

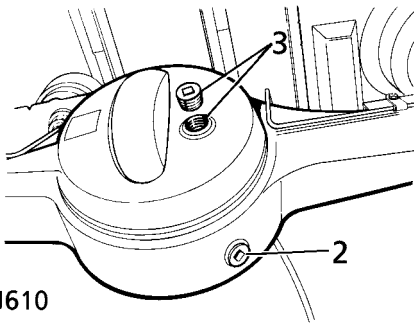
WARNING

For safety, DO NOT work underneath the vehicle unless it is safely parked with the wheels chocked, or is supported by heavy duty stands.

Extreme care should be taken when draining axle oil, it may be hot and cause severe scalding.

NOTE: *A rear axle is illustrated, but the procedure is the same for both axles.*

Ensure the vehicle is parked on firm, level ground and chock the wheels. Place a suitable container under the axle to be drained to catch the used oil.



J610

- Clean the area surrounding the drain plug (2) and filler level plug (3), to prevent contamination of the axles.
- Remove the drain plug (2) and allow the oil to drain completely.

- Clean and refit the drain plug.
- Remove the filler level plug (3) and inject the correct grade of oil (see 'General data') until it begins to run from the hole.

WARNING

Use only NEW oil - DO NOT use oil previously drained from the system.

- Clean and refit the filler level plug.
- Wipe any surplus oil from the area and remove the wheel chocks.

Workshop maintenance

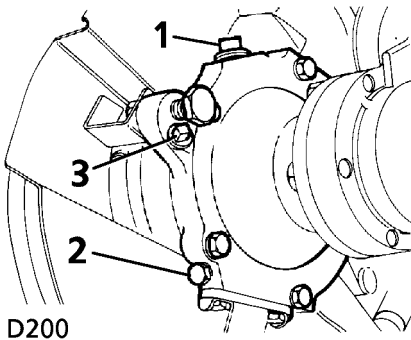
STEERING SWIVEL PIN HOUSING OIL RENEWAL

NOTE: On later models, the swivel pin housings are lubricated for life during manufacture and so are not fitted with drain or level plugs (see below). Maintenance on this type of swivel pin housing is not required.

WARNING

For safety, DO NOT work underneath the vehicle unless it is safely parked with the wheels chocked, or is supported by heavy duty stands.

Ensure the vehicle is parked on firm, level ground and chock the wheels. Place a suitable container under each swivel housing to catch the used oil.



D200

- Clean and refit the drain plug.
- Remove the filler plug (1) and the level plug (3) and inject the correct grade of oil (see 'General data') into the filler hole, until it begins to run from the level hole.

WARNING

Use only NEW oil - DO NOT use oil previously drained from the system.

- Clean and refit the filler and level plugs.
- Wipe any surplus oil from the area and remove the wheel chocks.
- Repeat the procedure on the other swivel housing.

- Clean the area surrounding the drain plug (2), filler plug (1) and level plug (3), to prevent contamination.
- Remove the drain plug (2) and allow the oil to drain completely.

Workshop maintenance

BRAKE PAD, DISC AND CALIPER CHECK

If the vehicle is being operated in arduous conditions, especially when deep mud and/or wading situations are regularly encountered, the condition of the brake pads, discs and calipers should be checked at least weekly, if not even more frequently.

Hydraulic disc brakes are fitted to the front and rear wheels, they are self adjusting and therefore, no provision for manual adjustment is made.

- Check the thickness of the brake pads, which should not be less than 0.125 in (3 mm).
- Check for uneven brake pad wear.
- Check for oil contamination on the brake discs and pads.
- Check condition of the brake discs for wear and/or corrosion.
- Check the brake calipers for any leaking brake fluid.

If necessary, any replacement or rectification of discs, brakes or calipers, should be carried out by a Land Rover dealer.

Workshop maintenance

PARKING BRAKE CHECK/ADJUSTMENT

WARNING

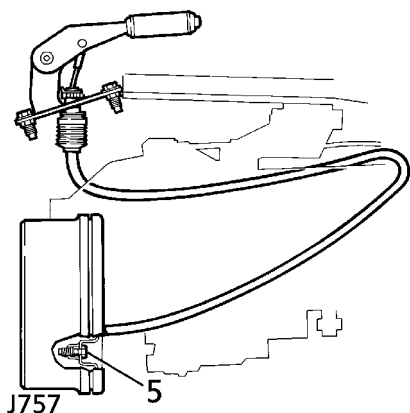
For safety, **DO NOT** work underneath the vehicle unless it is safely parked with the wheels chocked, or is supported by heavy duty stands.

Ensure the vehicle is parked on firm, level ground and chock the wheels.

Select 'P' and release the parking brake.

If the parking brake movement is excessive, adjust as follows:

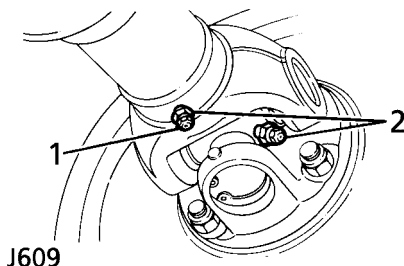
- Raise one rear wheel clear of the ground and ensure it is supported securely with an axle stand.



- Tighten the adjusting bolt (5) to a torque of 18 lbf/ft (25 Nm) and ensure that the brake drum is locked - if this is not the case, consult a Land Rover dealer.
- Now loosen the adjusting bolt by turning it 1.5 turns counter-clockwise.

The brake drum should now be free to rotate, and the brakes shoes correctly adjusted.

PROPELLER SHAFT LUBRICATION



- Clean all the grease nipples on the front and rear propshaft universal joints (1). Charge a low pressure hand grease gun with the recommended grade of grease (see 'General data') and apply to the grease nipples (2).

WARNING

Any additional greasing of the propshaft MUST be carried out by an authorised Land Rover dealer.

SECTION 6

General data

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General data

Lubrication nipples (hubs, ball joints, prop. shafts, etc.)

NLGI-2 Multipurpose Lithium based grease

Brake reservoir

Universal brake fluids or any brake fluid having a minimum boiling point of 500° F (260° C) and complying with FMVSS 116 DOT4

Windscreen washers

Screen washer fluid

Engine cooling system

Ethylene glycol based anti-freeze (containing no methanol) with non-phosphate corrosion inhibitors suitable for use in aluminum engines. Use one part anti-freeze to one part water for protection down to -33° F (-36° C)

Air conditioning compressor

Use only refrigerant R134A and refrigerant oil ND 8

Door locks (anti-burst) and inertia reels

DO NOT LUBRICATE. These components are lubricated for life during manufacture.

Battery terminals

Petroleum jelly. DO NOT use silicone grease.

General data

CAPACITIES

The following capacities are approximate and provided as a guide only. All oil levels must be set using the dipstick or level plugs as applicable.

	US units	Imperial	Metric
Fuel tank - usable capacity	15.6 US gall	13.00 Imp gall	59,09 litre
Engine sump	6.5 US quarts	10.70 Imp pt	6,01 litre
Additional capacity after fitting new oil filter	1.2 US pt	1.00 Imp pt	0,56 litre
Main gearbox	9.5 US quarts	15.70 Imp pt	9,10 litre
Transfer gearbox	4.8 US pt	4.00 Imp pt	2,30 litre
Front differential	3.6 US pt	3.00 Imp pt	1,70 litre
Rear differential	4.8 US pt	4.00 Imp pt	2,30 litre
Cooling system	27.0 US pt	22.50 Imp pt	12,80 litre

General data

ENGINE

Bore	3.70 in (93,98 mm)
Stroke	2.800 in (71,12 mm)
Number of cylinders	8
Cylinder capacity	241 in ³ (3950 cc)
Compression ratio	9.35:1
Firing order	1, 8, 4, 3, 6, 5, 7, 2
Sparking plug type	Champion RN11YC
Sparking plug gap	0.033 - 0.038 in (0,84 - 0,96 mm)

STEERING

Turns, lock to lock	3.38
Camber angle	Zero
Castor angle	3°
Swivel pin inclination	7°
Front wheel toe-out	0 to 2 mm
Turning circle between kerbs	40.4 ft (12,3 m)

ELECTRICAL SYSTEM

Type	Negative ground
Voltage	12
Battery	380/120/90
Charging circuit	Alternator
Ignition system	Electronic

REPLACEMENT BULBS

Headlights	60/55 W Halogen sealed beam
Parking lights	12 V 5 W
Side marker lights	12 V 3.5 W
Stop lights	12 V 21 W
Tail lights	12 V 5 W
Direction indicator lights	12 V 21 W
Number plate lights	12 V 4 W
Reversing lights	12 V 21 W
Rear fog guard lights	12 V 21 W
Interior lights	12 V 10 W
Warning lights	12 V 1.2 W
Instrument illumination	12 V 2 W
High level stop light (soft top)	12 V 5 W
High level stop light (station wagon)	12 V 21 W

General data

DIMENSIONS

Overall length (including spare wheel)	160.5 in (4072 mm)
Overall width	70.5 in (1790 mm)
Overall height	80.2 in (2037 mm)
Wheelbase	92.9 in (2360 mm)
Track front/rear	58.5 in (1486 mm)
Width between wheel boxes	36.4 in (925 mm)

OFF-ROAD PERFORMANCE

Max. gradient	45°
Approach angle	51° curb weight
Departure angle	35° curb weight
Wading depth	20 in (500 mm)
Min. ground clearance (unladen)	9.0 in (229 mm)
Ramp break over angle	146°

TOWING WEIGHTS (REFER TO SECTION 3)

Maximum permissible towed weights	On-road	Off-road
Unbraked trailers	1653 lb (750 kg)	1102 lb (500 kg)
Trailers with brakes	7716 lb (3500 kg)	2204 lb (1000 kg)
Tongue Weight	350 lb (160 kg)	350 lb (160 kg)

NOTE: All weight figures are subject to local restrictions.

General data

VEHICLE WEIGHTS

Curb weight*	
Soft top	3768 lb (1710 kg)
Station wagon	3902 lb (1770 kg)
Gross vehicle weight	6001 lb (2720 kg)

* Curb weight = unladen vehicle weight + full fuel tank (no occupants or payload)

Gross axle weight rating

Front (GAWF)	2701 lb (1225 kg)
Rear (GAWR)	3300 lb (1495 kg)

NOTE: Axle weights are non additive. The individual maximum axle weights and gross vehicle weight must not be exceeded.

WHEELS

Wheel size	7J x 16
Road wheel nut torque	125 lbf/ft (170 Nm)

TYRE SIZE & PRESSURES

	Front	Rear
Normal - all load conditions		
265/75 R16 radial (multi-terrain)	193 Kpa 28 lbf/in ² (psi)	242 Kpa 35 lbf/in ² (psi)

WARNING

Tyre pressures must be checked with the tyres cold, as the pressure is about 21 Kpa (3 psi) higher at running temperature.

If the vehicle has been parked in the sun or high ambient temperatures, DO NOT reduce the tyre pressures, move the vehicle into the shade and wait for the tyres to cool before checking the pressures.

WARNING

ALWAYS use the same make and type of radial-ply tyres, front and rear. DO NOT use bias-ply tyres, or interchange tyres from front to rear.

- If the wheel is marked 'TUBED', an inner tube MUST be fitted, even with a tubeless tyre.*
 - If the wheel is marked 'TUBELESS', an inner tube must NOT be fitted.*
-

SECTION 7

Parts & accessories

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Parts & accessories

PARTS AND ACCESSORIES

Your vehicle has been designed, manufactured and proven to cope with the most rigorous driving conditions. As such, fitting parts and accessories that have been developed and tested to the same stringent standards is essential to guarantee the continued reliability, safety and performance of the vehicle.

To augment the vehicles' already awesome ability, a comprehensive and versatile range of quality spare parts and accessories are available to fulfil a wide variety of roles, both enhancing and protecting the vehicle in the many tasks to which it can be applied.

Genuine Land Rover Parts are the ONLY parts built to original equipment specifications AND approved by Land Rover designers - this means that every single part and accessory has been rigorously tested by the same engineering team that designed and built the vehicle and, with the exception of maintenance items that are designed to be replaced sooner, is fully guaranteed for twelve months or 12,000 miles (20,000 km).

A full list and description of all available accessories is available from your Land Rover dealer.

Always consult your dealer for advice regarding the approval, suitability, installation and use of any parts or accessories before fitting.

WARNING

DO NOT fit unapproved accessories or conversions, as they could affect the safety of the vehicle. Land Rover will not accept any liability for death, personal injury, or damage to property which may occur as a direct result of fitment of non-approved accessories, or the carrying out of non-approved conversions, to Land Rover vehicles.

Land Rover North America Inc. strongly advises against making any modifications to the suspension or steering system. This could seriously effect the handling and stability of the vehicle, leading to loss of control or rollover.

Always consult a Land Rover dealer before fitting accessories, and before commencing any conversion or alteration to the vehicles' original specification.

Electrical equipment

WARNING

It is extremely hazardous to fit or replace parts or accessories whose installation requires the dismantling of or addition to either the electrical or fuel system.

Fitting inferior quality parts or accessories, may be dangerous and could invalidate the vehicle warranty.

Parts & accessories

Travelling abroad

In certain countries, it is illegal to fit parts which have not been made to the vehicle manufacturers' specification.

Owners should ensure that any parts or accessories fitted to the vehicle while travelling abroad, will conform to the legal requirements of their own country when they return home.

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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Driving on soft surfaces & dry sand	139
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Climbing steep slopes	141
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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.*

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.

HIGH range gears should be used whenever possible; only change to LOW range when ground conditions become very difficult. Uncontrolled spinning of individual wheels will be limited by the viscous coupling unit which is combined with the centre differential.

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.

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.

Off-road driving

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

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 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.

Off-road driving

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.

Off-road driving

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.

Off-road driving

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.

Off-road driving

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:

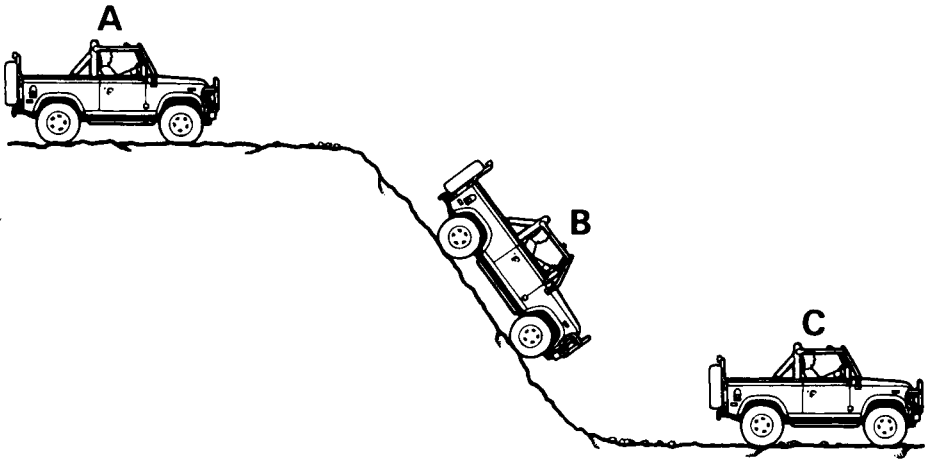
1. Hold the vehicle stationary using both foot and parking brakes.
2. Restart the engine if necessary.
3. Engage reverse gear LOW range.
4. Release the parking brake. Then, release the foot brake and allow the vehicle to reverse down the slope, using engine braking to control the rate of descent.

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.



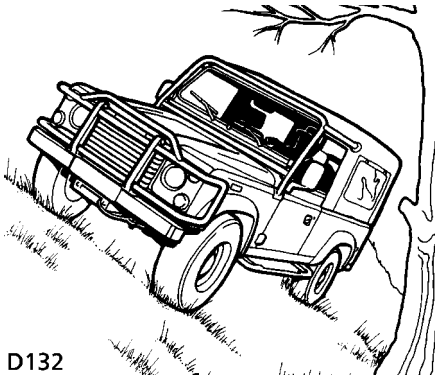
ST429

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.



D132

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.



D155

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.

Off-road driving

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.



D131

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.



D154

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 parking brake to hold the vehicle stationary, until the transmission has thoroughly dried out; in the meantime, leave the vehicle parked in gear.
- 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.