DEFENDER 90·110·13

CONTENTS

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CONTENTS

Specification details set out in this Handbook apply to a range of vehicles and not to any particular vehicle. For the specification of any particular vehicle owners should consult their Distributor or Dealer.

The Manufacturers reserve the right to vary their specifications with or without notice and at such times and in such manner as they think fit. Major as well as minor changes may be involved in accordance with the Manufacturer's policy of constant product improvement.

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INTRODUCTION

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MODELS COVERED

The information in this handbook covers current versions of Land Rover Defender 90, 110 and 130 petrol and diesel models, It is presented in sections to guide the reader progressively from reception of the vehicle through familiarisation with controls and instrumentation, driving techniques, basic day to day attention and longer term workshop maintenance. The final section lists technical data, recommended lubricants and fluids and electrical data.

Advice on operating Tdi turbo-charged diesel models is also included in this book. On these models, it is particularly important that the proper engine starting and stopping procedures are followed and that the correct engine lubricating oils are used.

Where specific information is sought, first consult the list of contents (at the front of the book) which will direct you to the relevant page or pages.

1 INTRODUCTION

THE NEW VEHICLE

With every new Land Rover special literature is provided which should be read by all owners and drivers to help obtain the best operating results. The literature consists of the following:

1. Handbook: This book, which you are now reading, gives general information about the Land Rover, also incorporates notes on service, the Vehicle Warranty and full information on how to carry out the necessary day-to-day running maintenance.
2. Service Record which gives details of the maintenance required and includes spaces for the Distributor or Dealer to sign and stamp to certify that the work has been carried out at the appropriate intervals.

The operations carried out by your Distributor or Dealer will be in accordance with current recommendations and may be subject to revision from time to time.

Upon receiving the new Land Rover the owner should immediately:

3. Examine the Handbook for advice on new features and as an aid to getting the best out of the vehicle.
4. Arrange with a Land Rover Distributor or Dealer to carry out regular maintenance attention.

VEHICLE WARRANTY

Land Rover issue under the heading of Vehicle Warranty an undertaking regarding its Service Policy. The Vehicle Warranty is supplied in the Literature Pack and the following notes are given for guidance in the event of a claim being put forward:

1. The Land Rover or the part in respect of which a claim is made must be taken immediately to a Land Rover Distributor or Dealer. This should, wherever possible, be the Distributor or Dealer responsible for the sale of the vehicle to the owner.
2. The Distributor or Dealer will examine the parts or Land Rover and will without charge advise on the action to be taken in respect of the claim. It will be noted that the Company must reserve the right to examine any alleged defective parts or material should they think fit prior to the settlement of any claim.
3. It must be understood that the factors of wear and tear and any possible lack of maintenance or unapproved alteration will be taken into consideration in respect of any claim submitted.
4. It will be noted that tyres and glass are expressly excluded. The manufacturers of those tyres which the Company fits as standard to its vehicle will always be prepared to consider any genuine claim.

PARTS AND ACCESSORIES
When new parts or accessories are required, obtain Genuine Land Rover parts, or parts supplied through sources approved by the Company.
Land Rover Distributors and Dealers are obligated to supply only such parts.
Other sources often sell parts suitable for Land Rovers but frequently these are not made to the same standard or specification as the Company part and are therefore less likely to give the requisite performance.

Genuine Land Rover parts and accessories are designed and tested for your vehicle and have the full backing of the Land Rover Vehicle Warranty. ONLY WHEN GENUINE LAND ROVER PARTS ARE USED CAN RESPONSIBILITY BE CONSIDERED UNDER THE TERMS OF THE WARRANTY.

Safety features embodied in the vehicle may be impaired if other than genuine parts are fitted. In certain territories, legislation prohibits the fitting of parts not to the vehicle manufacturer's specification. Owners purchasing accessories while travelling abroad should ensure that the accessory and its fitted location on the vehicle conform to mandatory requirements existing in their country of origin.

MAINTENANCE ATTENTION
Regular maintenance is one of the main factors in ensuring continuing reliability and efficiency. For this reason detailed schedules have been prepared so that at the appropriate mileages or times owners may know what is required.

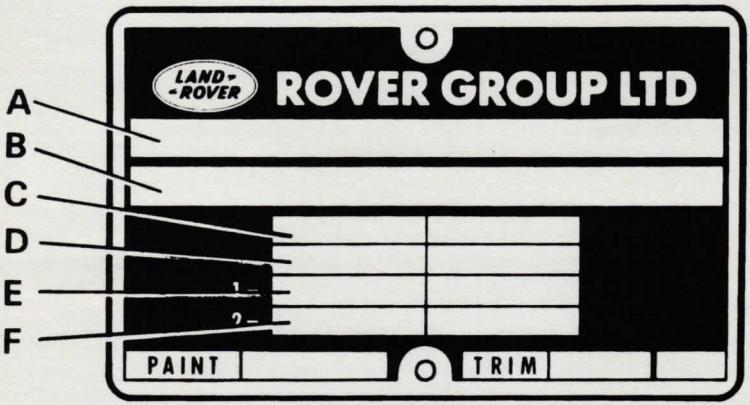
The **Pre-delivery Inspection** is a very important first step in the work of preventive maintenance. The Dealer responsible for the sale of the new Land Rover will have completed the work involved.
There is provision in the Service Record for certification that this work has been carried out.

Normal day-to-day attention required is described in Section 4 of this handbook.

The **first Service Inspection** should be carried out by the Dealer responsible for the sale of the Land Rover to the owner at or about 1500 km (1000 miles). A charge is made only for the lubricants, etc. used in carrying out the service.
Where for any reason it is not convenient for this first service to be carried out by the Dealer responsible for the sale, it can, by prior arrangement, be carried out by any other Land Rover Distributor or Dealer.

WORKSHOP MAINTENANCE
This is the necessary work to keep the vehicle reliable, and should be done at 10000 km (6000 mile) intervals, or six months, whichever is first, as described in Section 5 of this handbook.

VEHICLE IDENTIFICATION NUMBER (V.I.N)



J242

The Vehicle Identification Number and the recommended maximum vehicle weights are stamped on a plate that is rivetted to the top of the brake pedal box in the engine compartment.

The number is also stamped on the right-hand side of the chassis forward of the spring mounting turret.

Always quote this number when writing to Land Rover or your Distributor and Dealer on any matter concerning your Land Rover.

KEY TO VEHICLE IDENTIFICATION NUMBER PLATE - FIG. J242

A Type approval
B V.I.N (minimum of 17 digits)
C Maximum permitted laden weight for vehicle
D Maximum vehicle and trailer weight
E Maximum road weight - front axle
F Maximum road weight - rear axle

The Vehicle Identification Number identifies the manufacturer, model range, wheel base, body type, engine, steering/transmission, model name and place of manufacture.

FOR YOUR SAFETY

As you read through this manual you will see several places marked **WARNING, CAUTION** or **NOTE** presented in the following form. These have been included to remind you of areas where you should use extra care to avoid personal injury or damage to the vehicle or components.

WARNING: Procedures which must be followed precisely to avoid the possibility of personal injury.

CAUTION: This calls attention to procedures which must be followed to avoid damage to components.

NOTE: This calls attention to methods which make a job easier to perform.

As you attend to your vehicle you may see labels with this WARNING symbol. It means WARNING; DO NOT touch or attempt adjustments until you have read the special instructions contained on the relevent pages in this manual.

A label with this symbol WARNS that there are very high voltages in the ignition system on some models. DO NOT touch any ignition component while the ignition is switched on, especially where you see this label.

SAFETY

In the interests of road safety, your attention is drawn to the following important safety hints.

- Regular servicing, including day to day attention by the driver/owner as described in Section 4 and the longer term workshop maintenance described in Section 5, is essential to help provide safe, dependable and economical motoring and to ensure that the vehicle conforms to the various safety regulations in force.
- Always use the seat belts, even for the shortest journeys.
- Before driving, learn the layout and use of all controls, gears and switches.
- Before driving the vehicle adjust the seat as necessary to achieve a comfortable driving position with full control over the vehicle.
- Always start vehicle and operate controls from the driving position.
- Ensure that the vehicle speed is low enough for an emergency stop to be made safely under all road and vehicle loading conditions.
- Never leave unsupervised children in the vehicle.
- Keep the windscreen, rear and side windows clean to give clear vision. Use a solvent in the screen washer reservoir.
- Maintain all external lights in good working order and correct setting of headlamp beams.
- When a steering lock is fitted, DO NOT turn the ignition key to the lock position or try to remove the key whilst the vehicle is in motion.
- When fitted, ensure the power take-off (pto) universal joints are shielded.
- Before working on pto driven implements always disengage the pto and switch 'off' the engine.
- Maintain correct tyre pressures. These should be checked at least each month, or more often when high-speed touring or under cross-country conditions, even to the extent of a daily check.

1 INTRODUCTION

WARNING: Your Land Rover Defender has a higher ground clearance and hence a higher centre of gravity than an ordinary passenger car to enable it to perform in a wide variety of off-road applications. An abrupt manoeuvre at an inappropriate speed or on an unsuitable surface could cause the Land Rover to go out of control.

WARNING: DO NOT mix Cross-Ply and Radial-Ply tyres on this vehicle. Recommended tyre replacements are given at the end of DATA Section 6.

WARNING: DO NOT remove the expansion tank filler cap when the engine is hot, because the cooling system is pressurised and personal scalding could result.

WARNING: Additions, alterations or repairs to the electrical or fuel systems can create fire hazards if carried out incorrectly. Adhere strictly to methods described in this Owner's Manual or to instructions supplied with genuine Land Rover parts.

WARNING: Many liquids and other substances used in motor vehicles are poisonous, they must not be consumed under any circumstances and must be kept away from open wounds. These substances include anti-freeze, brake fluid, fuel, windscreen washer additives, lubricants, battery contents and various adhesives.

WARNING: Some components on your vehicle, such as gaskets and friction surfaces (brake linings or clutch discs), may contain asbestos. Inhaling asbestos dust is dangerous to your health. Before commencing any work on these components, read the warnings and instructions in Section 5.

WARNING: Keep hands, hair and clothing well clear of the fan blades and other rotating parts, when the engine is running. To avoid the possibility of personal injury.

WARNING: DO NOT replace the road wheels with any type other than genuine Land Rover wheels, as they are designed for multi-purpose on and off road use and have very important relationships with the proper operation of the suspension system and vehicle handling. Replacement tyres should be one of the makes and sizes recommended in this manual and all be the same make, ply rating and tread pattern. If in any doubt, consult your Land Rover Dealer for advice.

KEY NUMBERS ON MODELS FITTED WITH STEERING COLUMN LOCK

For security reasons the key numbers are not marked on the locks. If the key for the steering column lock is lost, the vehicle cannot be driven. For this reason and because the keys are of a special type, obtainable only from a Land Rover Distributor or Dealer, two steering column lock keys are supplied with each vehicle.

Owners are advised to take the following action:

(a) Immediately on receipt of the vehicle, record all the key numbers so that in case of loss, new keys can be obtained.

(b) Keep a spare steering column lock key away from the vehicle in a safe place, but where it is readily accessible.

The steering column lock if properly used reduces the possibility of theft.

Remember the breakdown safety code

If breakdown occurs while travelling:-

- Wherever possible, consistent with road safety and traffic conditions, the vehicle should be moved off the main thoroughfare preferably into a lay-by. If breakdown occurs on a motorway, pull well over to the inside of the hard shoulder.

- Switch on hazard lights.

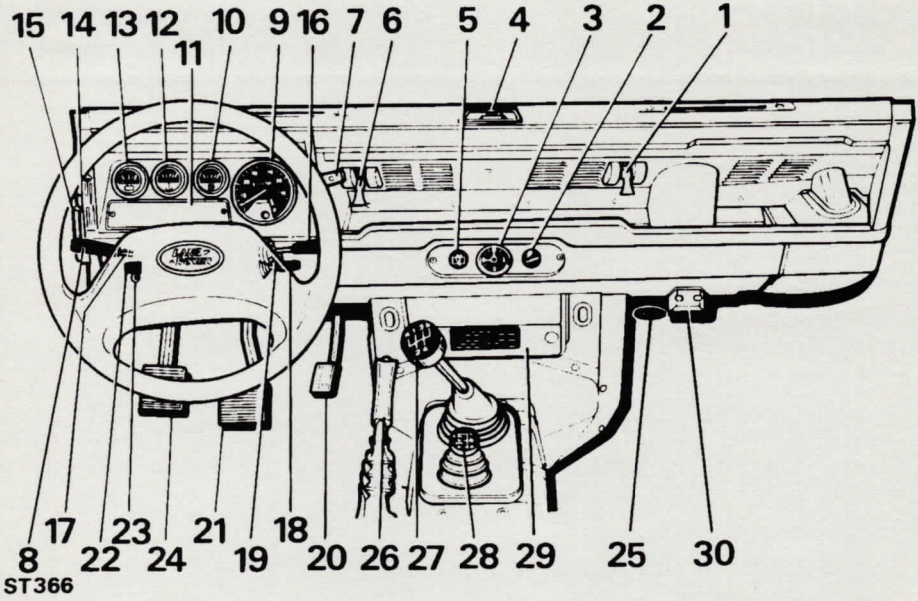
- Consider evacuating passengers through nearside doors on the verge as a precaution in case of your Land Rover being struck by another vehicle.

If a portable **Warning Triangle** is available place it a safe distant behind your vehicle.

A Simple Solution?

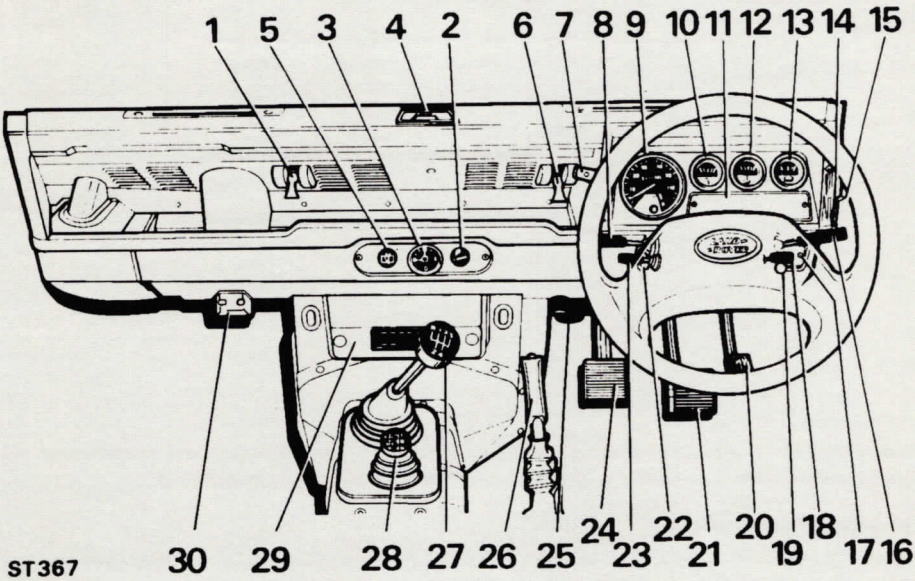
Many causes of breakdown are often simple and easily resolved. If the engine will not start refer to the fault finding chart in Section 3.

CONTROLS 2



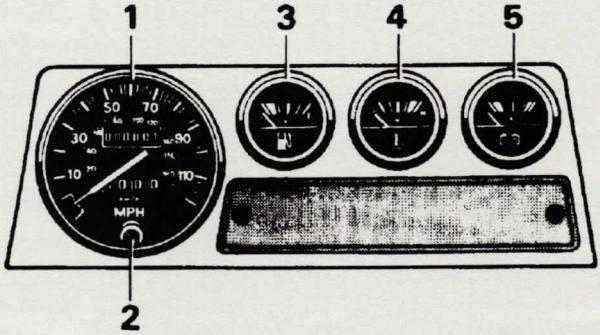
DRIVING CONTROLS - LEFT HAND STEERING

1 Ventilator control
2 Cigar lighter (option)
3 Clock (option)
4 Ash tray
5 Rear screen wash/wipe switch (option)
6 Ventilator control
7 Heater fan control
8 Headlamp dip, direction indicators, horn and flasher switch
9 Speedometer
10 Fuel gauge
11 Warning light cluster
12 Water temperature gauge
13 Voltmeter (option)
14 Heat temperature control
15 Heat distribution control
16 Windscreen washer and wiper switch
17 Switch panel for hazard warning, instrument and interior lighting and heated rear screen (option)
18 Rear fog guard lighting switch
19 Cold start control (Petrol models)
20 Accelerator pedal
21 Footbrake pedal
22 Starter and steering lock switch
23 Main lighting switch
24 Clutch pedal
25 Bonnet release handle
26 Transmission handbrake lever
27 Main gearchange lever
28 Transfer gear/differential lock lever
29 Fuse box
30 Footwell vent



DRIVING CONTROLS - RIGHT HAND STEERING

1 Ventilator control
2 Cigar lighter (option)
3 Clock (option)
4 Ash tray
5 Rear screen wash/wipe switch (option)
6 Ventilator control
7 Heater fan control
8 Headlamp dip, direction indicators, horn and flasher switch
9 Speedometer
10 Fuel gauge
11 Warning light cluster
12 Water temperature gauge
13 Voltmeter (option)
14 Heat temperature control
15 Heat distribution control
16 Windscreen washer and wiper switch
17 Switch panel for hazard warning, instrument and interior lighting and heated rear screen (option)
18 Rear fog guard lighting switch
19 Cold start control (Petrol models)
20 Accelerator pedal
21 Footbrake pedal
22 Starter and steering lock switch
23 Main lighting switch
24 Clutch pedal
25 Bonnet release handle
26 Transmission handbrake lever
27 Main gearchange lever
28 Transfer gear/differential lock lever
29 Fuse box
30 Footwell vent



ST020

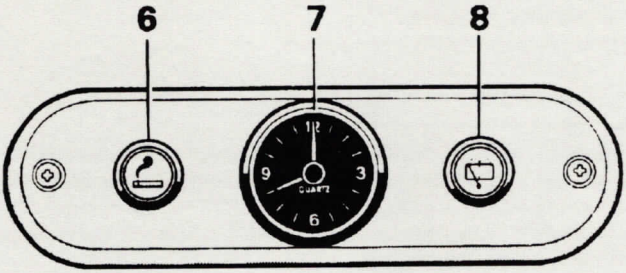
SPEEDOMETER
The speedometer (1) incorporates a total mileage indicator. Speedometers with trip mileage indicators are available as optional equipment and have a trip reset button fitted.

SPEEDOMETER TRIP SETTING
Reset trip back to zero by pushing the small black knob (2) on the front of the speedometer.

FUEL LEVEL INDICATOR
The fuel indicator (3) shows the approximate contents of the tank.

COOLANT TEMPERATURE INDICATOR
Under normal running conditions the temperature indicator needle (4) should register in the black band. If the needle moves to the red band during normal running, the vehicle should be stopped and the cause investigated.
The design of the fuel level and water temperature indicators ensures that the needle does not fluctuate, but there is a time lag of a few seconds before they register after the ignition, or electrical services, are switched on.

VOLTMETER (option)
The voltmeter (5) measures the vehicle system voltage. With the engine running above idling speed the indicator should register within the black central band. A reading above this in the high red band which continues after 10 minutes running is too high and should be investigated. A reading in the low red band with the engine running at high idle speed, with no electrical loads switched on, after 10 minutes is too low and should be investigated.



ST215

NOTE: A Right-Hand steering panel is illustrated, Left-Hand Steering is symmetrically opposite.

CIGAR LIGHTER (option) Fig. ST215
The cigar lighter (6) is operated by pushing the extended knob inwards to heat the element. When a predetermined temperature is reached, the knob will eject from the heat position, permitting the lighter to be withdrawn for use.
A small pilot lamp is incorporated within the socket surround to facilitate replacement of the element during darkness. The pilot lamp bulb is automatically lit when the vehicle sidelights are on.

CLOCK (option)
The hands of the electrically operated clock (7) may be set by pushing in and turning the black knob in the centre of the face.

REAR SCREEN WIPER AND WASHER SWITCH (option)
The rear screen washer/wiper switch (8) is only operative with the engine starter key in the engine running position.

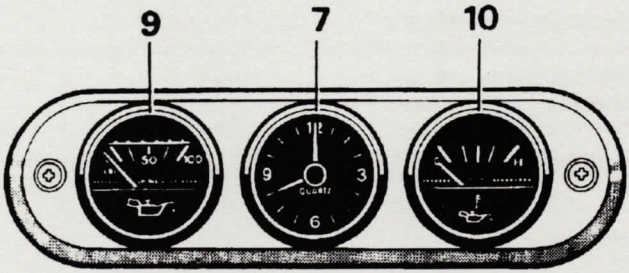
(a) Rotate the switch to the right to activate the rear screen wiper.
(b) To wash the rear screen, press the spring loaded switch knob until sufficient water is on the rear screen. Releasing the knob will shut off the rear screen washer water. This operation may be carried out with the screen wiper switch ON or OFF.

OIL PRESSURE GAUGE Fig. ST021 (option)
Under normal running the oil pressure indicator (9) should show the following pressure:

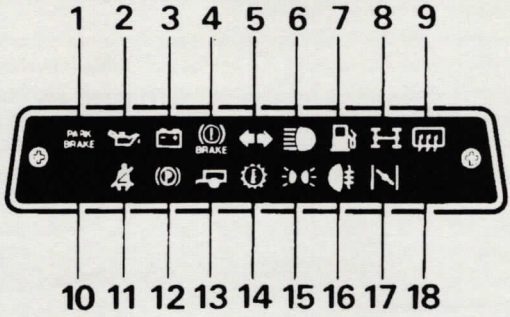
4-cylinder petrol and diesel models-
2,5 to 4,5 kgf/cm^2 (35 to 65 lbf/in^2) 240 to 440 kPa

V8-cylinder petrol models-
2,1 to 2,8 kgf/cm^2 (30 to 40 lbf/in ^{2}) 200 to 275 kPa.
The needle may drop below these figures when the engine is idling but providing the oil pressure rises to within the specified figures immediately the engine speed is increased, the oil pressure can be considered to be satisfactory.
If the needle moves to the zero position during normal running the vehicle should be stopped immediately and the cause investigated.

OIL TEMPERATURE GAUGE (option)
The oil temperature gauge (10) provides a continuous indication of the oil temperature. When the engine oil reaches its normal operating temperature, the gauge indicator needle should register in the mid-way area. Should the needle travel to the 'H' (hot) red block during normal running, the vehicle must be stopped and the cause investigated.



ST021



ST364

KEY TO WARNING LIGHT PANEL - Fig. ST364

1.	Park brake (Australia only)	Red
2.	Oil pressure	Red
3.	Ignition/no charge	Red
4.	Brake circuit	Red
5.	Direction indicators	Green
6.	Main beam	Blue
7.	Low fuel	Amber
8.	Differential lock	Amber
9.	Heated rear window	Amber
10.	Not used	
11.	Seat belt warning (Saudi Arabia)	Red
12.	Park brake - option	Red
13.	Trailer - option	Green
14.	Transmission oil temperature	Red
15.	Side lights on	Green
16.	Rear fog - (certain markets)	Amber
17.	Cold start	Amber
18.	Not used	

OIL PRESSURE WARNING LIGHT

The red warning light illustrated must glow when the ignition is switched on.

IGNITION/NO CHARGE WARNING LIGHT

The red warning light illustrated should glow when the engine starter switched is turned on.

NOTE: Ignition/no charge and oil warning lights should be checked when starting the vehicle from cold; they should light up immediately the ignition is switched on and extinguish when the engine is running. The warning lights may flicker when the engine is running at idling speed but provided they fade out as the engine speed increases, the charging rate and oil pressure are satisfactory. If the oil pressure warning light comes on during normal running, the vehicle should be stopped immediately and the cause investigated. The ignition warning light is connected in series with the alternator field circuit. Bulb failure would prevent the alternator charging, therefore the bulb should be checked before suspecting an alternator fault. A failed bulb should be changed with the minimum of delay otherwise the battery will become discharged.

BRAKE CIRCUIT CHECK WARNING LIGHT

This red warning light is most important and is arranged to warn if there is a fluid leakage from either the front or rear braking system when the engine is running. If leakage occurs the warning light will come on when brakes are applied. The brake circuit warning light will operate momentarily when the starter is actuated. This confirms that the warning circuit is functioning correctly. If the light comes on during normal running or braking, the vehicle should be stopped immediately, and the cause investigated.

WARNING: DO NOT drive the vehicle while the brake warnining light is illuminated.

DIRECTION INDICATOR ARROWS

Both direction indicator arrows flash in conjunction with the direction indicator lamps, when operated by the switch on the steering column. If the direction indicator arrows do not operate as described, there may be a bulb failure in the warning lamp panel or one of the directionindicator lamps.

MAIN BEAM WARNING LIGHT

The blue light glows when the headlamp main beams are in use. Its purpose is to remind you to dip the headlamps when entering a brightly lit area, or when approaching other traffic.
The warning light will also glow when the headlamp flasher switch is used.

FUEL LEVEL WARNING LIGHT

The amber warning light will be illuminated when there is approximately 9 litres (2 gallons) left in the fuel tank. The light will remain on until the fuel supply is replenished. Intermittent flashing may occur when cornering, etc. before the fuel level drops below two gallons. If a diesel model is allowed to run out of fuel, the fuel system must be primed when the tank is replenished.

DIFFERENTIAL LOCK WARNING LIGHT

The amber warning light will be illuminated when the gearbox differential lock control is operated.

HEATED REAR SCREEN WARNING LIGHT

The amber warning light will be illuminated when the heated rear screen switch is in the ON position, acting as a reminder to the driver that the switch and heated rear screen are switched ON.

TRAILER WARNING LIGHT

The trailer warning light is operative when a trailer is connected to the vehicle via a seven-pin socket (optional equipment). It will flash in conjunction with the vehicle indicator warning lights, thus ensuring that the trailer indicator lamps are functioning correctly. In the event of an indicator bulb failure on the trailer, the warning light will flash once only and then remain extinguished. Where a trailer is not used or connected, the trailer warning light will only operate when the hazard warning system is in use.

TRANSMISSION OIL TEMPERATURE WARNING LIGHT

The red warning light illuminate when a high oil temperature is sensed in either the main gearbox or transfer .

It will also illuminate as a bulb check when the handbrake level is applied with the starter switch turned to position 'II'.

The warning light may also illuminate in high ambient temperatures under the following conditions.

* Driving continuously at high speeds for long periods.
* Towing heavy loads up long inclines for sustained periods.

Should the warning light illuminate, reduce speed and select a lower gear. If the light remains on, stop the vehicle when it is safe and practical to do so, until the light extinguishes. When towing heavy loads, it may be necessary to select low range (L) on the transfer gearbox.

NOTE: The warning light should only illuminate under very hot conditions. If it illuminates under reasonable conditions, the cause should be investigated by your dealer.

SIDE LIGHTS WARNING LIGHT

The green warning light (with symbol) will be illuminated when the side lights are switched on.

REAR FOG GUARD LAMPS WARNING LIGHT

The amber warning light will be illuminated when the rear fog guard lamps are operating.

COLD START WARNING LIGHT

- PETROL MODELS

When the cold start control is pulled out, an amber warning light with this symbol is illuminated to remind the driver that the cold start control is still out and should be returned to the 'off' position as soon as possible, consistent with even running.

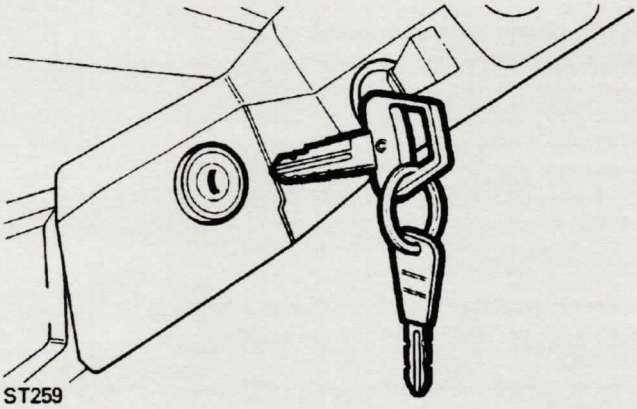
- DIESEL MODELS

On diesel models the amber warning light will glow when the engine starter key is turned to the heater plugs 'on' position and will go off after a few seconds when the starting temperature is correct. If the light remains on with the engine running there is a fault that should be investigated. When operating in ambient temperatures of below -28°C, the use of a coolant heater is recommended.

HAZARD WARNING LIGHT

When the hazard warning light switch is pressed at the lower end, all four flasher lights operate simultaneously. The red warning light (with triangular symbol) in the switch will flash in conjunction with the exterior flasher lights.

Use the hazard warning system to warn following or oncoming traffic of any hazard, that is, breakdown on fast road, or an accident to your own or other vehicles.



STEERING COLUMN LOCK (WHERE APPLICABLE) - Fig. ST259

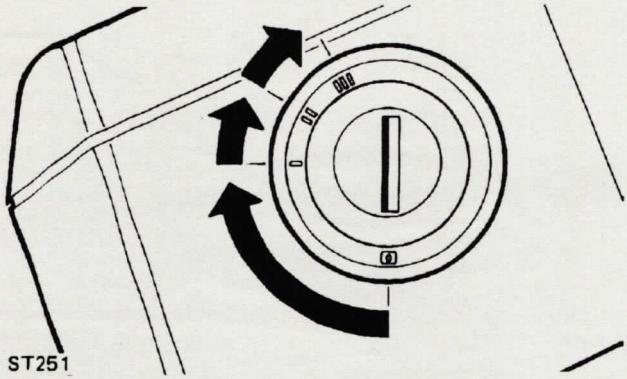
On models fitted with a steering column lock, the lock is an integral part of the ignition and starter switch on petrol models and the heater plug and starter switch on diesel vehicles. The following instructions should be studied in conjunction with the engine starter switch operation overleaf.

To unlock the steering, insert the key and turn it forward to the first position. If the steering lock has been engaged, slight movement of the steering wheel will assist in its disengagement.

To lock the steering, turn the key fully back, and withdraw it from the lock.

WARNING: If for any reason the (ignition) engine is switched off while the vehicle is in motion, do not attempt under any circumstances to remove the key, otherwise the steering lock will be engaged.

WARNING: To prevent the steering column lock engaging it is most important that before the vehicle is moved in any way, for example, being towed or coasting, the key must be inserted in the lock and turned to the first position. If, due to an accident or electrical fault it is not considered safe to turn the key, the battery must first be disconnected, then turn the key.

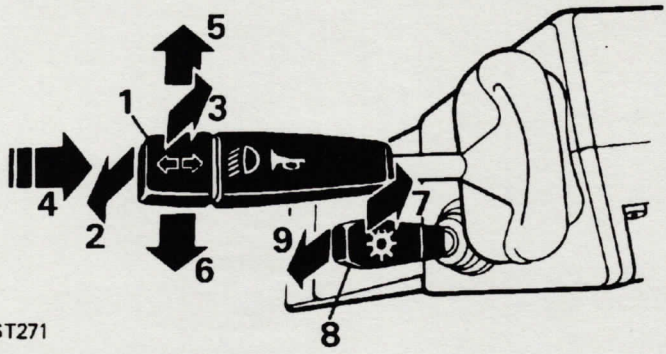


STEERING LOCK AND ENGINE STARTER SWITCH - Fig. ST251
The engine starter switch is combined with the steering column lock. The switch is key operated and has four positions.

'O' Steering locked. All electrical circuits (except lights) switched off.
'I' Steering unlocked. Auxiliary position: heater blower motor and accessories, such as radio can be used.
'II' Ignition switched on (Petrol models).
Heater plugs switched on (Diesel models).

CAUTION: Petrol models - DO NOT leave the ignition switched on without the engine running, as the battery could become discharged and would not start the engine.

'III' Starter motor operates. Release the key immediately the engine starts; the key will automatically return to the 'run' mode with oil and charge lights and accessories.



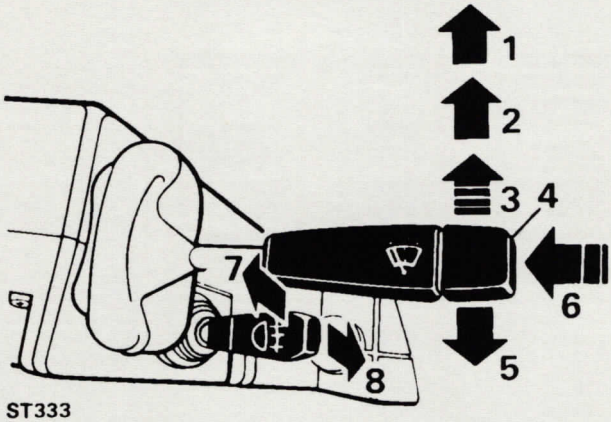
ST271

HEADLAMP DIPPER SWITCH, COMBINING DIRECTION INDICATORS, HORN AND HEADLAMP FLASHER - Fig. ST271

The switch has six positions:
Switch in central position (1): dipped headlamps.
Switch pushed away from driver (2): main beam
Switch pulled towards driver (3): headlamp flash. The headlamps can be flashed at any time, irrespective of other switch positions.
Press dipper switch knob inwards (4) to operate horn.
Move switch to upper position (5) to indicate a right-hand turn.
Move switch to lower position (6) to indicate a left-hand turn.

MAIN LIGHT SWITCH - Fig. ST271

The main light switch has three positions:
Switch pulled towards driver (7): all lamps off.
Switch in centre position (8): side lamps on. (U.K. only: side lamps and dim dip headlamps on).
Switch pushed away from driver (9): with the engine starter key in the run (II) position, side and headlamps on.



ST333

WINDSCREEN WIPER SWITCH AND SCREEN WASH - Fig. ST333

The windscreen wiper switch has five positions and is only operative when the engine starter key is in the engine running position.

Switch in upper position (1): fast-speed wiper.

Switch in second position (2): slow-speed wiper.

Switch in third position (3): 'flick wipe': wipers will operate at slow speed until switch is released.

Switch in fourth position (4): wipers off.

Switch in lowest position (5): intermittent wipe. Approximately five seconds delay between each wipe.

Switch pressed in (6): screen wash position. Hold the switch until sufficient water is ejected on to the screen, then release. This can be done with the wiper switch on or off.

HEADLAMP WASH

If the headlamp washer facility is fitted (optional), this will operate in conjunction with the windscreen washer when the headlamps are switched on in the dipped position.

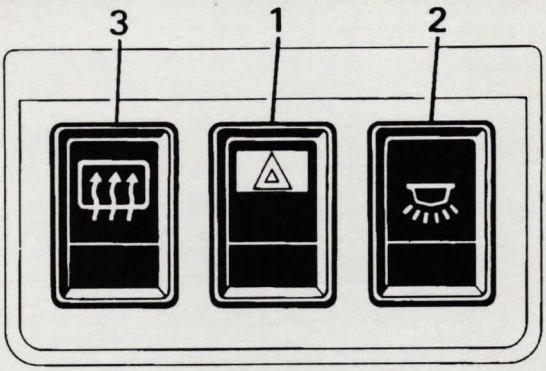
The headlamp washer jet units are fitted on the front bumper, one in front of each headlamp. The jet direction can be adjusted with the aid of a needle inserted into the orifice which can also be cleared with a fine needle or wire when necessary.

REAR FOG GUARD LAMPS SWITCH (fitted in certain markets) - Fig. ST333

The switch has two positions and can be operated with or without the ignition on but is effective only with the headlamps on.

(A) Switch pulled towards driver (7): fog lamps off.

(B) Switch pushed away from driver (8): fog lamps on.



ST342

Fig.ST342

HAZARD WARNING SWITCH (1)

The switch has a rocker action and the following positions:

(a) Press the upper end of the switch: hazard warning system off.
(b) Press the lower end of the switch: all flasher lights operate simultaneously.

Use the hazard warning system to warn following or oncoming traffic of any hazard, that is, breakdown on fast road, or an accident to your own or other vehicles.

INTERIOR LIGHT SWITCH (2) where fitted

The switch has a rocker action and the following positions:

(a) Press the upper end of the switch: interior lights comes on when either front door is opened, and goes off when the door is closed.
(b) With the switch in the centre position: the interior light will come on, and remain on, with the doors closed or open.
(c) Press the lower end of the switch: the interior light will remain off in all conditions.

HEATED REAR SCREEN SWITCH (WHEN FITTED) (3)

The switch has a rocker action and the following positions:

(a) Press the upper end of the switch: heated rear screen switched off.
(b) Press the lower end of the switch: to operate the rear screen demisting heater. This position will only be operative whilst the starter key is in the engine running position, and sufficient current is available. The integral warning lamp is lit when the switch is in the ON position, acting as a reminder to the driver that the switch and screen are on.

A voltage sensitive switch is incorporated in the circuit to allow the heated rear screen and other equipment to be used simultaneously under normal conditions

However, should the total electrical loadings be such that the alternator cannot maintain adequate charge, for instance, when using all electrical services in a traffic jam, the voltage sensitive switch, will cut-out, rendering the heated rear screen inoperative. The switch will automatically cut-in again restoring the heated screen function as soon as conditions are favourable.

ENGINE HAND THROTTLE (optional) - Fig. LR2099

This control will be found useful in conjunction with power take-off equipment and is used to over-ride the accelerator pedal linkage and set the throttle. This is suitable for all installations where precise speed control is not required, and where the engine load is light or relatively constant.

Place the transfer gear lever in Neutral (N) then, pull the hand throttle control out and twist it to lock it in the required position.

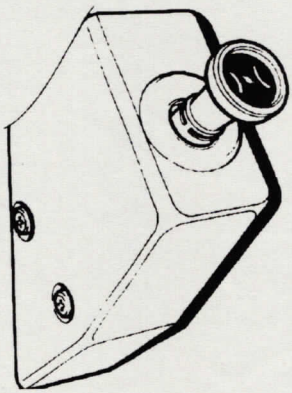
Operation of the accelerator will over-ride the hand throttle setting when increasing the engine speed. When the accelerator is released, the engine will return to the speed set by the hand throttle.

Before normal road driving is contemplated, check and ensure that the hand throttle is pushed fully down to the closed position.

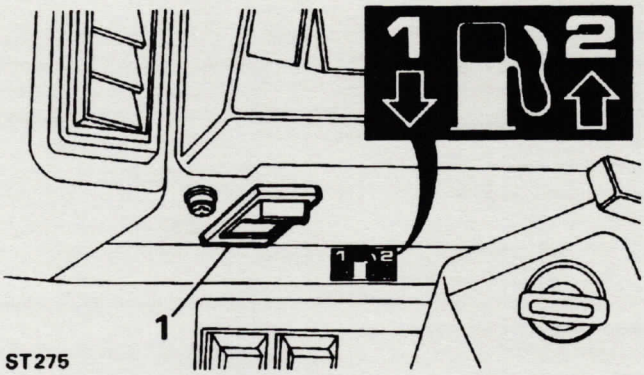
WARNING: DO NOT use the hand throttle while the vehicle is being driven.

Because the hand throttle is used to run the engine under load with the vehicle stationary, it may be necessary to fit an engine oil cooler system when used in hot climates.

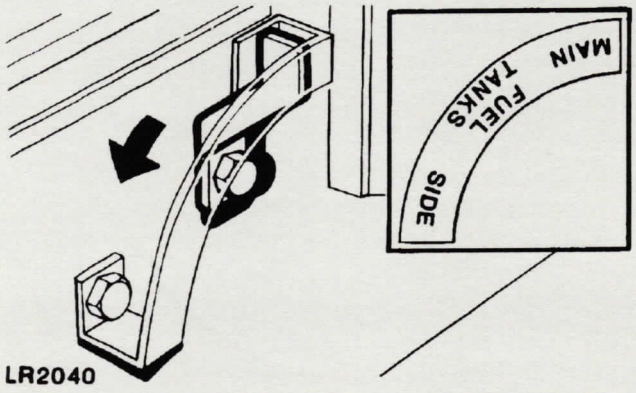
NOTE: Always release the locking mechanism before returning the control to the 'OFF' position.



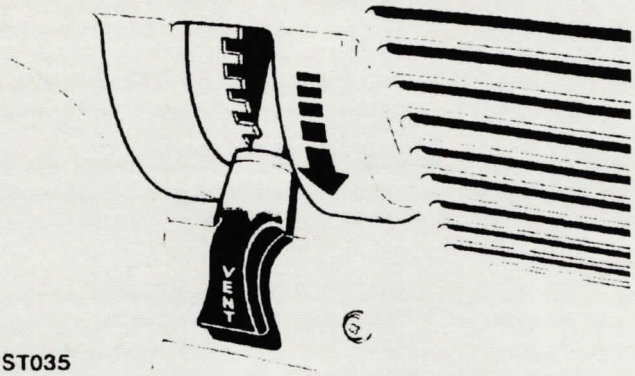
LR2099



FUEL TANK CHANGEOVER SWITCH - PETROL MODELS. Fig. ST275
If the vehicle is fitted with an extra fuel tank (option) a changeover switch (1) is located under the dash below the instrument panel, to enable the driver to select the supply from either tank.
Each tank is fitted with an electric fuel pump and a sender unit for the fuel contents gauge. The supply from either tank can be selected, and the contents checked, by operating the changeover switch with the ignition switched on.



FUEL TANK CHANGEOVER SWITCH - DIESEL MODELS. Fig. LR2040
If the vehicle is fitted with an extra fuel tank (option) a combined changeover tap and switch is located on the heelboard. Movement of the tap lever brings into use either the rear or the side tank, and switches the fuel level indicator to show the approximate contents of the tank in use. When the lever is in the horizontal position the side tank is in use, in the vertical position the main tank is in use.



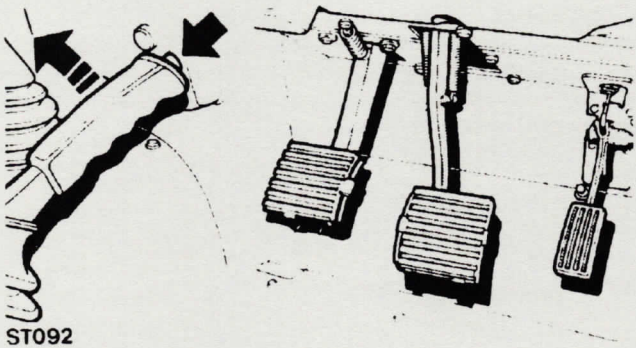
ST035

WINDSCREEN VENTILATORS - Fig. ST035
The two ventilators in the windscreen frame may be opened independently by pushing the lever downwards until each ventilator is open to the desired position. Use of the ventilators will be found advantageous when traversing dusty roads, as they greatly reduce the amount of dust sucked into the vehicle from the rear.

TRANSMISSION HANDBRAKE - Fig. ST092
A drum-type handbrake, well protected from dirt and water, operates directly on the transfer box rear output shaft and is designed for parking use only. When parking the vehicle on steep gradients and, or on slippery surfaces, the differential lock must also be engaged to ensure maximum effect.
The brake is applied by pulling back the lever. To release, pull the lever slightly back, depress and hold the release button while pushing the lever down to the limit of its travel.

WARNING: DO NOT apply the handbrake while the vehicle is in motion as this could result in loss of vehicle control and damage to the transmission.

PEDALS - Fig. ST092
Brake, clutch and accelerator pedals are the pendant type and function in the normal way. The brake and clutch operate hydraulically, with servo assistance for the brakes. The accelerator pedal has a mechanical linkage. To avoid needless wear of the clutch withdrawal mechanism do not rest the foot on the clutch pedal while driving.


ST092

STEERING
Manual or Power assisted steering is fitted, depending on vehicle specification.

CAUTION: Power assisted steering - under no circumstances must the steering wheel be held on full lock for more than thirty seconds in one minute, otherwise there will be a tendancy for the oil to overheat and damage to the seals may result.

GEARBOX CONTROLS AND RANGES

The main gearbox of the Land Rover is augmented by a two-speed transfer box giving high and low ranges. Therefore the five-speed manual gearbox used in conjunction with the transfer gearing produces ten forward and two reverse ratios.

MAIN GEARCHANGE LEVER - Fig. LR2014

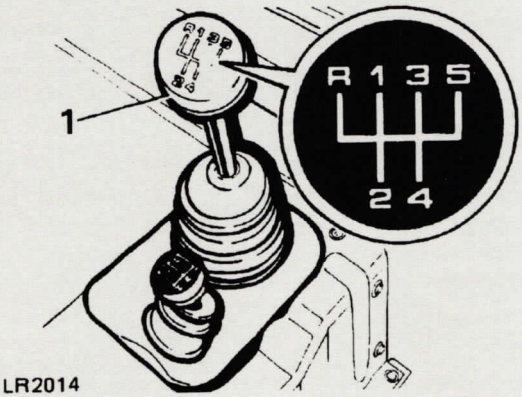
In neutral, light spring loads align the main gear lever (1) with the third/fourth gear positions to assist smooth gearchanging and to ensure selection of the required gear.

To select first or second gear, move the lever to the left against the spring and select the required ratio as normal. When changing between first and second gears, remember to continue to hold against the spring or the lever will return to the third/fourth position.

When changing from second to third gear, as second gear is disengaged, allow the spring to align the lever with the third position before engaging third gear.

To engage fifth gear, move the lever to the right against the spring and select the gear as normal. When changing from fifth to third or fourth gears, as fifth gear is disengaged, allow the spring to align the lever with the third/fourth positions before engaging the required gear.

To change from fifth to second or first gear, allow the lever to return to the third/fourth position and move the lever towards the left against the spring as already described. Note that fifth gear is designed to reduce engine speed and thus improve fuel economy when cruising. Ensure that while it is in use the engine runs easily without labouring, otherwise use a lower gear.

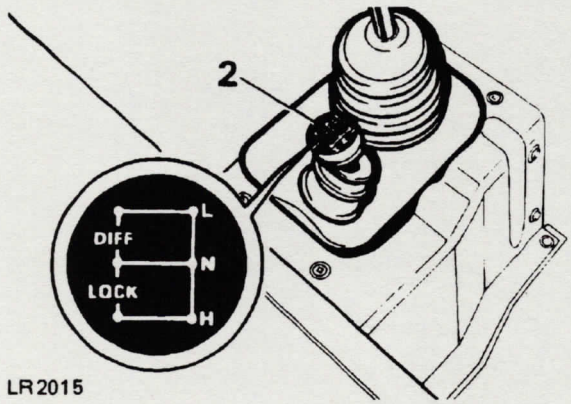


LR2014

Reverse is protected against inadvertent selection by an additional 'knock- over' spring load. To engage reverse, strike the lever as far as possible towards the left using the palm of the hand and move it forward to engage the gear. To disengage, pull the lever rearwards and allow the spring load to return to its normal position in neutral. It is recommended that, before driving away for the first time, the driver becomes familiar with the operation of the gear change by changing up and down through all ratios several times.

COMBINED TRANSFER GEAR AND CENTRE DIFFERENTIAL LOCK LEVER - Fig. LR2015
The transfer gear lever (2) controls the selection of the high or low gear ranges and the engagement of the centre differential lock. The lever, which is located immediately behind the main gear lever, has the following positions: **Central right, Position N**. Transfer box in neutral, centre differential unlocked. In this position drive cannot be transmitted to the road wheels regardless of the position of the main gear selector. Use this position for winching or power take-off (pto) and when being towed. **Fully forward and right, Position L.** Transfer gearbox low range engaged. **Fully forward and left, Position L + Diff lock.** Transfer gearbox low range engaged AND centre differential locked (warning light illuminated). **Fully rearwards and right, Position H.** Transfer gearbox high range engaged. This position is used for normal driving. **Fully rearwards and left, Position H + Diff lock.** Transfer gearbox high range engaged AND centre differential locked (warning light illuminated). **Centre left.** Transfer box in neutral, Position N, centre differential locked. (This position should not be used).

USE OF THE TRANSFER GEAR LEVER
CAUTION: Changing from high (H) to low (L), should only be attempted when the vehicle is stationary. Depress the clutch pedal and push the lever fully forward, release the clutch. Should there be any hesitation in the gear engaging, do not force the lever. With the engine running, engage a gear with the main gear lever and release the clutch momentarily, then return the main gear lever to neutral and try the transfer control again.



LR2015

Changes from low (L) to high (H) can easily be made as follows without stopping the vehicle. Depress the clutch pedal and release the accelerator pedal as for a normal gearchange. Move the transfer lever into neutral. Release the clutch pedal for 3 seconds. Depress the clutch pedal and move the transfer lever firmly to the 'high' (H) position. Then move the main gear lever to second gear and release the clutch pedal while depressing the accelerator to take up the drive smoothly. As the vehicle accelerates, change gear in the main gearbox in the normal way. This operation can be carried out smoothly and quickly after a little practice. Proper use of the gearbox range will ensure optimum efficiency and transmission component life.

GEARBOX DIFFERENTIAL LOCK

To allow the necessary variation of wheel speeds during cornering with permanent four-wheel drive, the Land Rover incorporates a third (centre) differential between the drives to front and rear axles.

In conditions requiring maximum traction to both axles, the gearbox differential unit can be locked so that both output shafts rotate at the same speed.

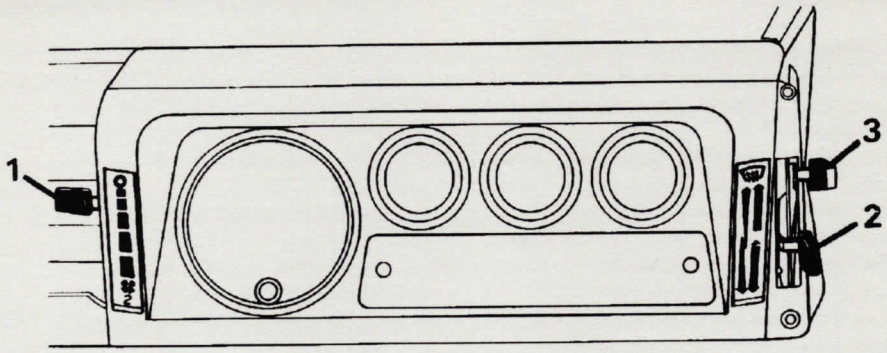
The centre differential is controlled through the combined transfer gear and differential locklever described on the previous page.

The control can be operatedwhile the vehicle is travelling without wheel slip and in a straightline, or while it is stationary. The differential should be locked before slippery or doubtful surface conditions are encountered. Move the lever to the left to lock the differential, and to the right to unlock it.

CAUTION: Engagement of the lock with one or more wheels slipping will cause damage to the transmission.

Under certain conditions a slight delay may be experienced before the differential becomes locked, with subsequent warning light illumination. This delay is a built-in safety precaution and ensures that gears are correctly aligned before differential locking occurs.

On disengagement of the lock there may be a short delay before the warning light goes out indicating differential unlocked. If the warning light remains on, this indicates that the transmission is 'wound-up'. The vehicle must be stopped and reversed for a few metres to 'unwind' the transmission; the warning light will then be extinguished and the vehicle can proceed.



ST276

FRESH AIR/HEATING SYSTEM - Fig. ST276

The heating system delivers fresh air to the windscreen for demisting and to the driving cab interior in variable temperature proportions, between cold and hot according to the setting of the controls. Warm or hot air will be available once the engine has attained normal working temperatures.

The heater has three controls:

1. Three speed blower switch.
2. Temperature control.
3. Air distribution control.

CAUTION: Ensure that the front grille and the air intake grille on the top of the front wing are clear of obstruction, including snow and ice.

WARNING: To reduce the risk of accidents caused by poor visibility always scrape frost and snow from all glass surfaces and clean snow from bonnet and roof panel before moving.

BLOWER SWITCH

Air supply volume is controlled by the blower switch (1) as follows:

SWITCH OFF - TOP POSITION

- System inoperative

SWITCH IN MID-POSITION

- Air supply by warm effect of the vehicle moving forward

SWITCH IN LOWER POSITIONS

- The blower motor will only operate with the engine running or the starter key turned to the first position. Move the lever down to the first or second stop, this will give slow or fast blower motor speed to boost the air flow into the vehicle.

TEMPERATURE CONTROL LEVER

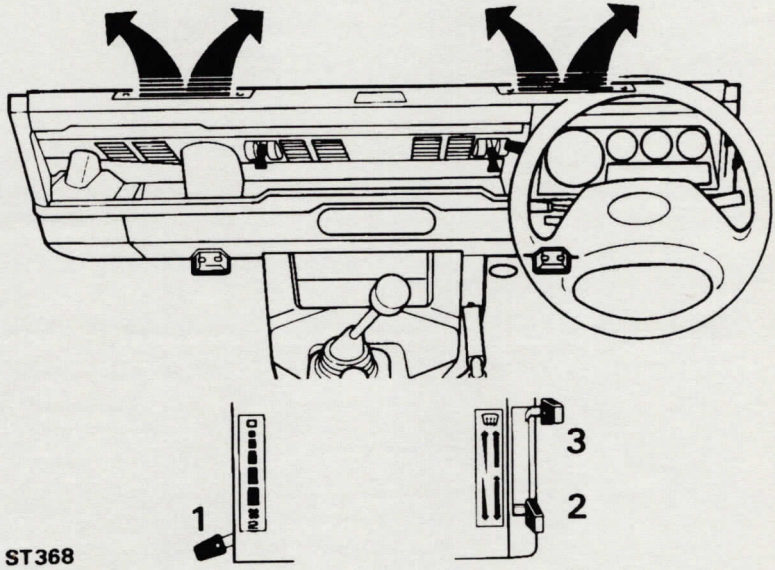
The temperature control lever (2) controls the temperature of the air from the heater unit.

- Move in direction of blue arrow to cut off heat.
- Move in direction of red arrow to increase heat.
- Action is progressive between the two.

DISTRIBUTION CONTROL LEVER

Distribution control lever (3) controls direction of air flow.

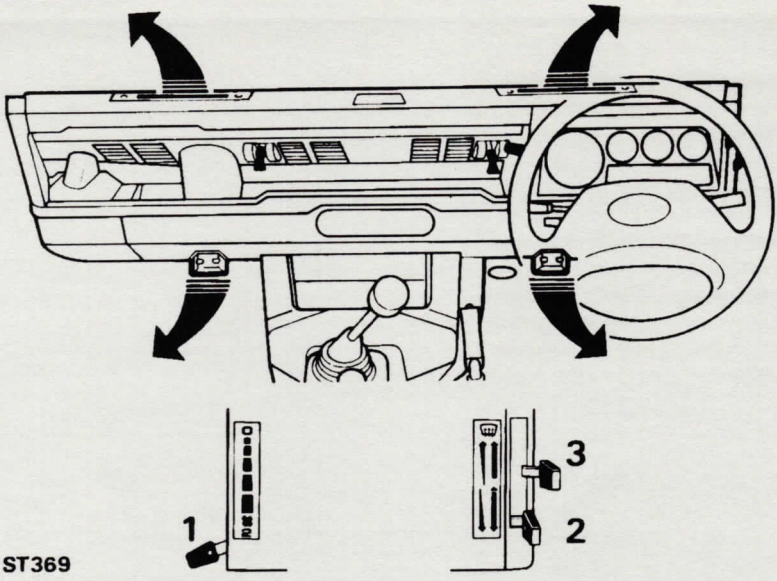
- Lever fully up, all air is directed on to the screen through the demister vents.
- Lever mid-way position, air is directed to the foot level vents and to the screen.
- Lever fully down, air is directed to the foot level vents although a certain amount will continue to pass through the demister vents.



ST368

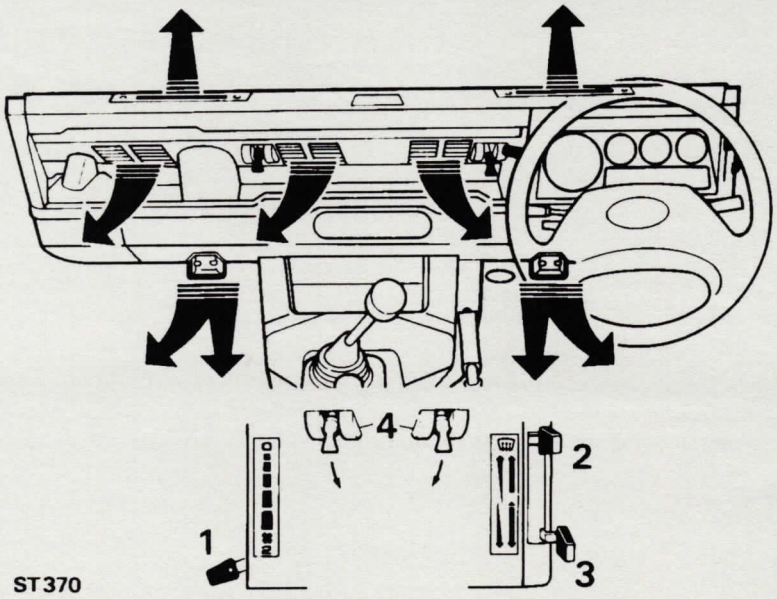
MAXIMUM DEMISTING AND DEFROSTING Fig. ST368

Set the distribution control (3) to the top position. Set the temperature control (2) to the lowest (Red) position. Push the blower motor switch (1) to the fast speed (lowest) position.



ST369

MAXIMUM HEATING Fig. ST369
Set the distribution control (3) in the mid position. Set the temperature control (2) to the lowest (Red) position. Push the blower motor switch (1) to the fast speed (lowest) position.

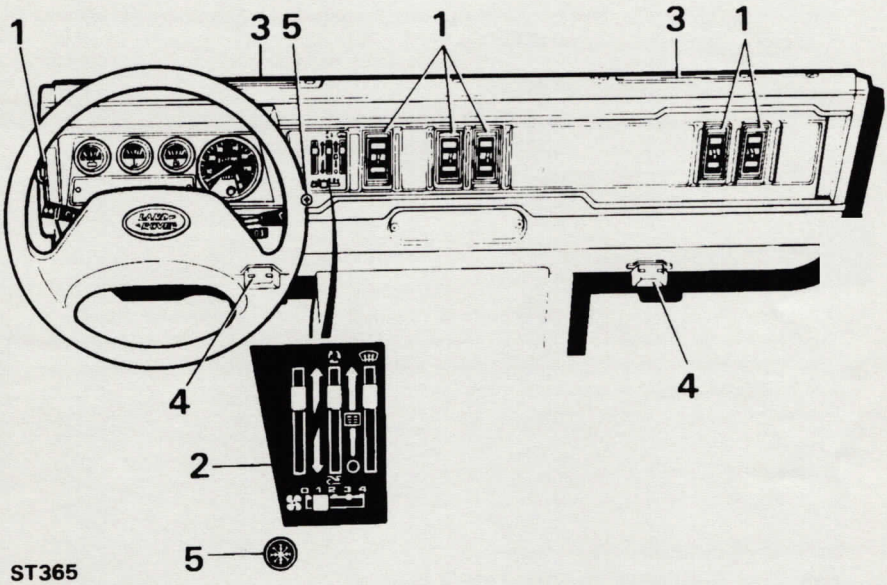


ST370

MAXIMUM FRESH AIR VENTILATION Fig. ST370
Set the distribution control (3) in the lowest position. Set the temperature control (2) to the top (Blue) position. Push the blower motor switch (1) to the fast speed (lowest) position. Push both ventilator controls (4) to the lowest (fully open) position.

AIR CONDITIONING SYSTEM (option) LEFT-HAND STEERING - Fig. ST365

The air conditioning system operates in conjunction with the vehicle heater to provide cooled and dried recirculated or fresh air.



ST365

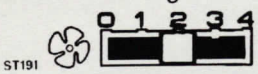
1 Fascia mounted louvres
2 Air conditioning control panel
3 Windscreen demister vents
4 Footwell vents
5 Air conditioning switch

AIR AND HEAT CONTROL - LH STEERING MODELS

FASCIA-MOUNTED LOUVRES

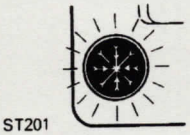
The six fascia-mounted louvres can be set to blow cooled, fresh or recirculated air, the vanes may be opened and adjusted to control the direction of airflow.

FAN CONTROL Fig. ST191



The fan controlshould be adjusted to regulate the volume of air required.

AIR CONDITIONING CONTROL Fig. ST201

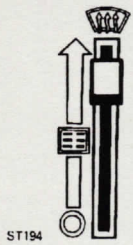


The air conditioning pushbutton control is pressed to switch on the air conditioning and is illuminated when operative.

TEMPERATURE CONTROL Fig. ST193

The temperature of air flowing from the footwell and windscreen may be regulated between cold (blue) and hot (red) by moving the control as required. For effective air conditioning, this control should be maintained in the cold (blue) position.

AIR DISTRIBUTION CONTROL Fig. ST194



The distribution control has three positions.

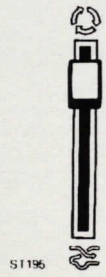
(a) Fully up.
Air is directed to the windscreen with a bleed to the footwell.

(b) Central position.
This position is used to direct air from the fascia-mounted louvres, with a bleed to the footwell.

(c) Lower position.
Air is directed to the footwells, although a certain amount will continue to flow through the demister vents to the windscreen.

Any of the air distribution positions may be used in conjunction with the temperature fan and air conditioning controls.

RECIRCULATION/FRESH AIR CONTROL Fig. ST195



The vehicle has a combined fresh air, or recirculating air system, designed to enable either system to be used separately. The air fed through the air distribution control can be either fresh air drawn from outside the vehicle or internally recirculated air. The recirculating heater is normally used in heavy traffic conditions to avoid obnoxious fumes entering the vehicle, also for rapid heat build up inside the vehicle during cold conditions. The recirculating control is used with air conditioning to achieve maximum cooling. It is also recommended that the recirculating control is used in dusty conditions to prevent dust entering the vehicle.

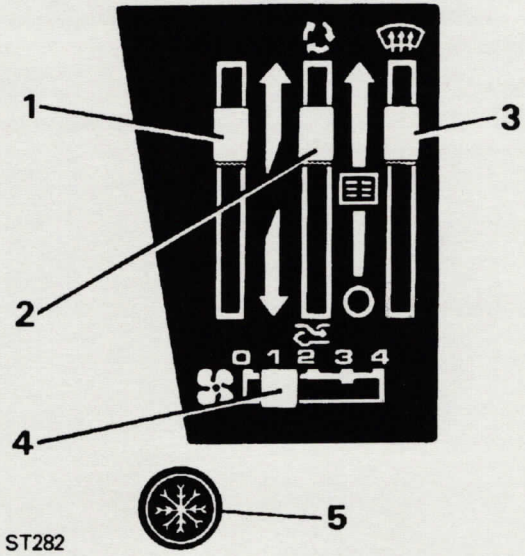
AIR AND HEAT CONTROL - LH STEERING MODELS

USING THE AIR CONDITIONING - Fig. ST282

Set the controls as follows:

1. Temperature control to blue zone - Fully down (cold).
2. Recirculation control - Fully up (recirculation).
3. Distribution control to mid position (fascia).
4. Fan control set between positions 1 to 4 as desired, to regulate the volume of airflow desired.
5. Air conditioning control pushed in to illuminate the pushbutton legend.

When the temperature inside the vehicle becomes comfortable, move the temperature control up slightly. This will prevent the evaporator cooling coils from becoming too cold and freezing up.



ST282

RAPID COOLING

Open a window.
Move the fan control to position 4.
Move the temperature control down to the coldest position.
Set the distribution control to mid position (fascia).
Recirculation control set to recirculation (fully up). After driving for several minutes, the hot air inside the vehicle will be expelled. Close the window, move the temperature control down slightly and adjust the fan speed as desired. **DO NOT** operate the air conditioning for long periods with the windows or sun roof (option) open, as the system would be working ineffectually at maximum output which could result in component damage.

Highway Driving
During a long journey when the ambient temperature and humidity are extremely high and the air conditioning is in use, frost may form on the cooling coils of the evaporator. The unit is equipped with an automatic defrost system which normally will prevent this. However if the temperature control is maintained in its coldest position for extended periods, the defrost system will not operate and the unit will not function correctly. Therefore, whenever possible, move the temperature control slightly up from extreme (cold) position.

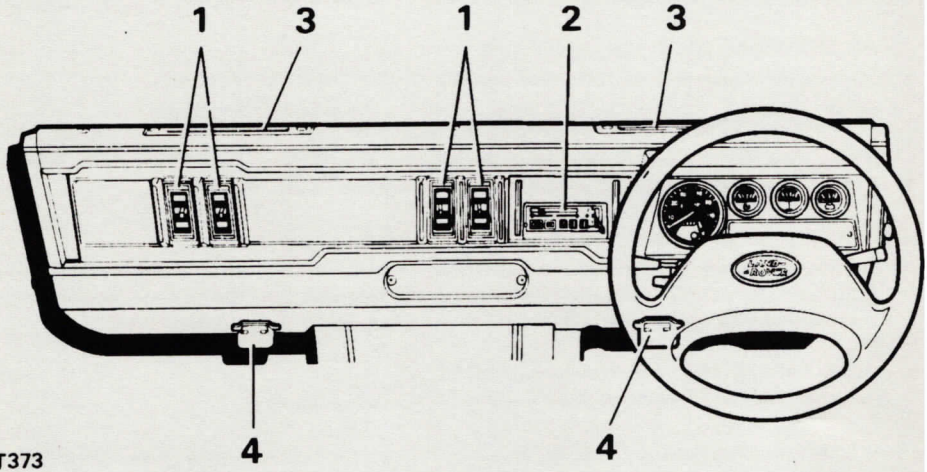
DEMISTING
Mist often forms on windows when the humidity is very high. To remove the mist, move the temperature and fan controls to their low positions. If the interior temperature is too low, use the heater in conjunction with the air conditioning. It is not necessary to use the system continuously, only when misting persists.

NOTE: For maximum demist effectiveness, use the fresh air supply (described earlier). Used in conjunction with the maximum heater setting, the air conditioning system will produce an air drying effect which will assist demisting.

HEATING
During cold weather the fan can be used to circulate warm air from the heater.
Move both the fan and temperature controls to the desired setting.

AIR CONDITIONING SYSTEM (option) RIGHT-HAND STEERING - Fig. ST373

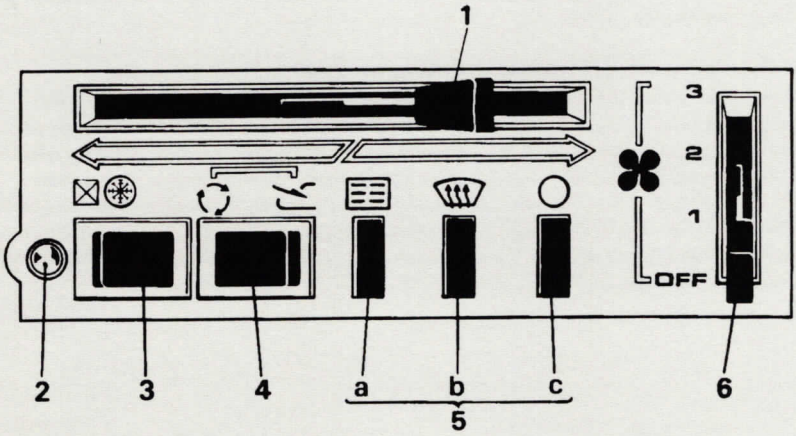
The air conditioning system operates in conjunction with the vehicle heater to provide cooled and dried recirculated or fresh air.



ST373

1 Fascia mounted louvres
2 Air conditioning control panel
3 Windscreen demister vents
4 Footwell vents

AIR AND HEAT CONTROL - RH STEERING MODELS Fig. ST230



ST230

1 Temperature control
2 Air conditioning warning light
3 Air conditioning control switch
4 Recirculation/fresh air control switch
5 Air distribution controls
6 Fan control

AIR AND HEAT CONTROL - RH STEERING MODELS

FASCIA MOUNTED LOUVRES - Fig. ST281

The five fascia-mounted louvres can be set to blow cooled, fresh or recirculated air, the vanes may be opened and adjusted to control the direction of airflow.

FAN CONTROL - Fig. ST230

The fan control should be adjusted to regulate the volume of air required.

AIR CONDITIONING CONTROL SWITCH - Fig. ST230

To switch on the air conditioning, push in the right side of the switch. The warning light will be illuminated and remain on until the air conditioning is switched off.

TEMPERATURE CONTROL - Fig. ST230

The temperature of air flowing from the footwell and windscreen may be regulated between cold (blue) and hot (red) by moving the control as required. For effective air conditioning, this control should be maintained in the cold (blue) position.

AIR DISTRIBUTION CONTROLS - Fig. ST230

The air distribution is controlled by three push button switches.

(a) LH button in
This position is used to direct air from the fascia-mounted louvres, with a bleed to the footwell.

(b) Centre button in
Air is directed to the windscreen with a bleed to the footwell.

(c) RH button in
Air is directed to the footwells, although a certain amount will continue to flow through the demister vents to the windscreen.
Any of the air distribution controls may be used in conjunction with the temperature fan and air conditioning controls.

RECIRCULATION/FRESH AIR CONTROL SWITCH - Fig. ST230

The vehicle has a combined fresh air, or recirculating air system, designed to enable either system to be used separately. The air fed through the air distribution control can be either fresh air drawn from outside the vehicle or internally recirculated air. The recirculating heater is normally used in heavy traffic conditions to avoid obnoxious fumes entering the vehicle, also for rapid heat build up inside the vehicle during cold conditions. The recirculation control is also used with air conditioning to achieve maximum cooling. It is also recommended that the recirculating control is used in dusty conditions to prevent dust entering the vehicle. Push the switch to the left for recirculating air. Press the switch to the right for fresh air.

AIR AND HEAT CONTROL - RH STEERING MODELS

USING THE AIR CONDITIONING - Fig. ST232

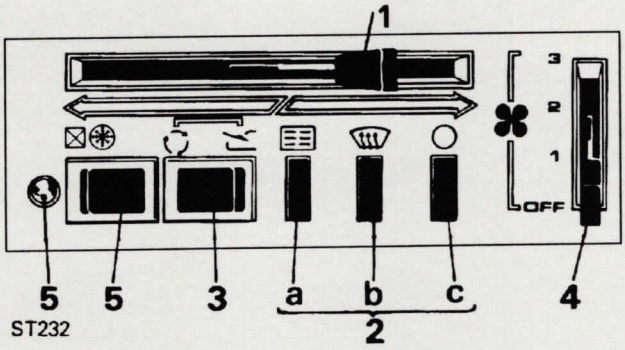
Set the heater controls as follows:
Temperature control (1) to blue zone - Fully left (cold). Distribution control (2) - Push in buttons 'a' to 'c' as required. Recirculation control (3) - Push in left side of switch. Fan control (4) set between positions 1 to 3 as desired, to regulate the volume of airflow desired. Air conditioning control (5) - Push in right side of switch to switch air conditioning on and illuminate warning light. When the temperature inside the vehicle becomes comfortable, slide the temperature control to the right slightly. This will prevent the evaporator cooling coils from becoming too cold and freezing up.

RAPID COOLING

Open a window. Move the fan control to position 3. Move the temperature control to the left to the coldest position. Push in the distribution control, as required. Recirculation control set to recirculation - Push in left side of switch. After driving for several minutes, the hot air inside the vehicle will be expelled. Close the window, move the temperature control to the right slightly and adjust the fan speed as desired. DO NOT operate the air conditioning for long periods with the windows or sun roof (option) open, as the system would be working ineffectually at maximum output which could result in component damage.

HEATING

During cold weather the fan can be used to circulate warm air from the heater. Move both the fan and temperature controls to the desired setting.



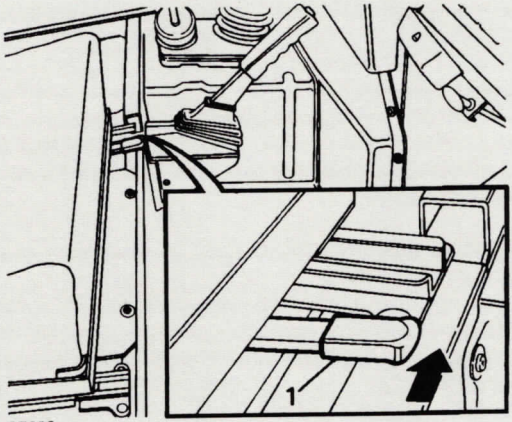
DEMISTING
Mist often forms on windows when the humidity is very high. To remove the mist, move the temperature and fan controls to their low positions. If the interior temperature is too low, use the heater in conjunction with the air conditioning. It is not necessary to use the system continuously, only when misting persists.

NOTE: For maximum demist effectiveness, use the fresh air supply (described earlier). Used in conjunction with the maximum heater setting, the air conditioning system will produce an air drying effect which will assist demisting.

Highway Driving
During a long journey when the ambient temperature and humidity are extremely high and the air conditioning is in use, frost may form on the cooling coils of the evaporator. The unit is equipped with an automatic defrost system which normally will prevent this. However if the temperature control is maintained in its coldest position for extended periods, the defrost system will not operate and the unit will not function correctly. Therefore, whenever possible, move the temperature control slightly up from extreme (cold) position.

WARNING: DO NOT adjust the seats while the vehicle is in motion, as this could cause loss of control.

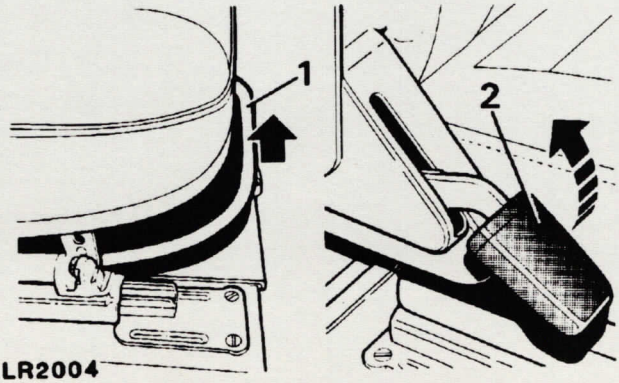
STANDARD FRONT SEATS WITH ADJUSTABLE CUSHION - Fig. ST339
The fore and aft movement is adjusted by pushing to the side the lever (1) at the base of the seat and moving the seat into the required position.



ST339

COUNTY FRONT SEATS - Fig. LR2004
Fore and aft adjustment. Lift the bar (1) at the front of the seat and slide the seat to the required position. Release the bar and ensure the seat guide catches have located the seat.

BACK REST ANGLE ADJUSTMENT (option)
Ease the body from the back rest and lift the locking handle (2). Apply body pressure to move the back rest to the required rake, then press the handle down to lock. The back rest return is spring assisted.



LR2004

HEAD RESTRAINTS
Head restraints can be fitted to seats with adjustable back rests on all models. Where fitted, each head restraint should be adjusted properly, to provide maximum effectiveness in the event of a collision.

REAR COMPARTMENT SEATS - ONE TEN STATION WAGONS

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.

By folding the separate sections of the rear seats, loads of various sizes and shape can be carried. Long items can be accommodated while still retaining some rear seating capacity.

PROTECTION OF REAR SEAT BELTS (where fitted)
Before folding down the rear seat backrests, first ensure that the outer inertia type belts are correctly stowed in their clip holders. Also, keep the centre lap belt fastened when not in use. To avoid damage to the inner sections of the inertia type belts and the centre lap belt mounted on the floor behind the rear seat, pass the four belts between the bottom of the seat backs and the seat to the rear floor.

Before erecting the rear seat, ensure that all inner seat belts are extended rearwards to prevent them from being trapped beneath the seatbase.
If the vehicle payload is likely to damage or chafe the belts in the rear floor area, they should be removed temporarily. In this event, unhook the belts from their respective floor mounted brackets by holding open the spring loaded safety catch. After reconnection, ensure that the safety catch returns to the closed position.

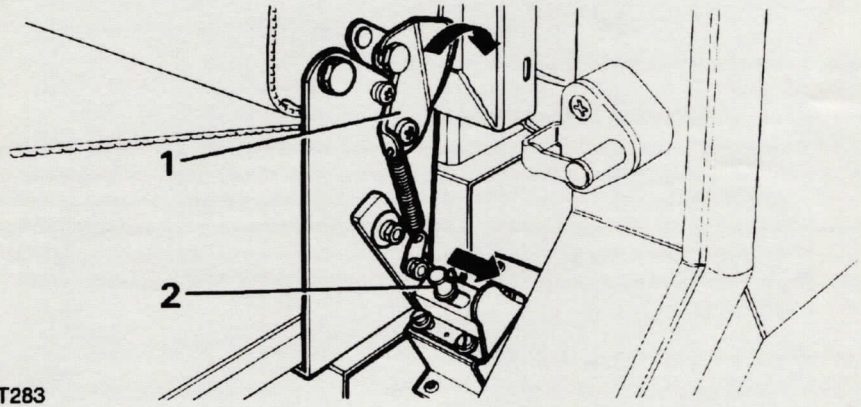
NOTE: Australia only - The belts are bolted to the rear floor.

The forward facing seats in the rear compartment can also be folded to provide increased luggage space. Two types of seat and retainers are in use, as follows:

VEHICLES WITH THREE INDIVIDUAL SEATS
The two outer seats are retained by sliding bolts at the body sides, the centre seat is held in position by flanges which locate under the outer seats.

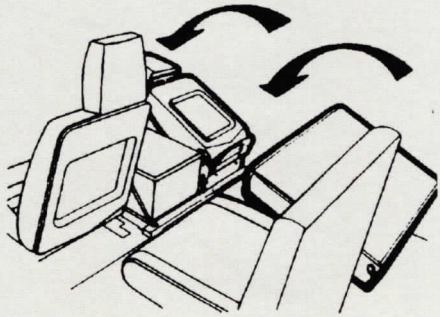
CARRYING BULKY LOADS Fig. ST283
Slide the front seats forward sufficiently to allow the rear seat backrests to be folded. Push back the catch (1) at the side of the seat to be folded and fold the backrest forward. Pull back the seat base retaining bolt (2) and tip the folded seat forward. When returning the seats to the normal position, check that the bolts and catches are engaged.

WARNING: When the seat is erected, the latching mechanism should be visually checked and physically tested to ensure that the latch is secure.



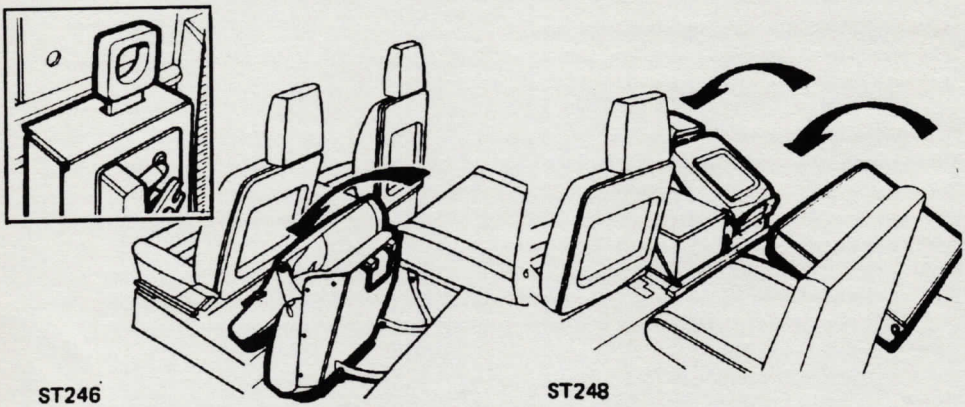
ST283

To accommodate extra long loads, fold the appropriate section of the backrest forward and incline the front passenger seat fully forward - Fig. ST248



ST248

MAXIMUM FLOOR SPACE
Slide the front seats forward sufficiently to allow the rear seat backrests to be folded. Fold the rear seat backrests and tip all three seats forward.

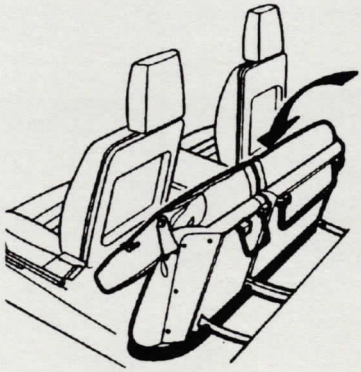


ST246 ST248

VEHICLES WITH TWO ASSYMETRICALLY SPLIT SEATS

CARRYING BULKY LOADS Figs. ST246 AND ST248
Slide the front seats forward sufficiently to allow the rear seat backrests to be folded. Pull up the ring-type release handle (inset Fig. ST246) located on the window ledge behind each backrest. Fold the appropriate section of the backrest and tip the folded seat forward. When returning the seats to the normal position, check that the rear support legs are pulled fully back, and that both backrest locks are correctly engaged. To accommodate extra long loads, fold the appropriate section of the backrest forward and incline the front passenger seat fully forward - Fig. ST248

MAXIMUM FLOOR SPACE - Fig. ST247
Slide the front seats forward sufficiently to allow the rear seat backrests to be folded. Pull the release handles upward, fold the rear seat backrests and tipboth sections of the seat assembly forward.

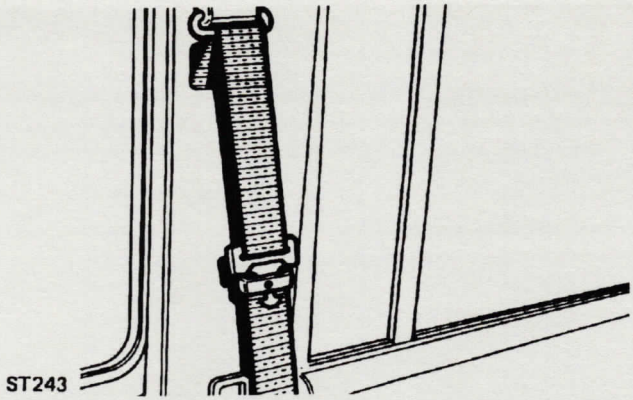


ST247

ROOF RACKS

Land Rover vehicles incorporating roofs with aluminium cantrails (rain water gutter) require the use of an approved roof rack. Information concerning suitable roof racks is available through the Land Rover parts service. These should be fitted very carefully following the manufacturers' instructions.

WARNING: DO NOT overload the roof rack or the stability of the vehicle will be affected. See further instructions in Section 3.



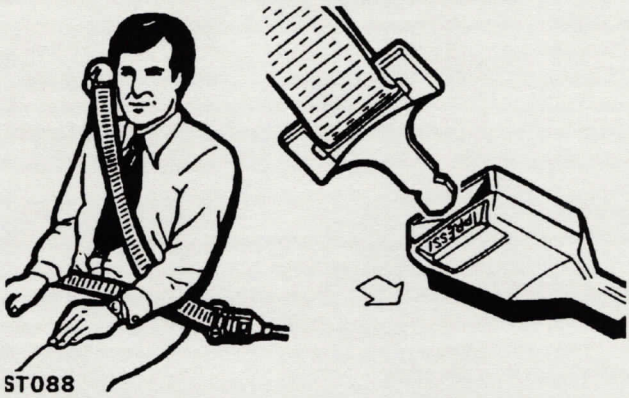
SEAT BELTS

General

WARNING: Seat belts are designed to bear upon the bony structure of the body, and should be worn low across the front of the pelvis, or the pelvis, chest and shoulders, as applicable; wearing the lap section of the belt across the abdominal area must be avoided.

All seat belts must be fitted to the anchorage points provided at both the drivers and passenger's position to comply with the United Kingdom or other territorial legal requirements.
In your interests, always use the seat belt provided, even for the shortest journeys. Alterations and additions must NOT be made to any type of seat belt fitted to this vehicle.

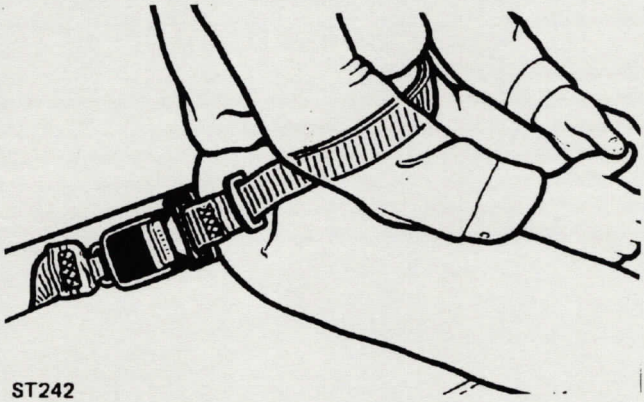
Two types of seat belt are in use, inertia reel (automatic) for the driver and outer passenger(s), lap type for all other passengers. The number and type of seat belts fitted is dependent on the specification of the vehicle.
Always ensure that the belt is lying flat and is not twisted either on the wearer's body or between the wearer and the anchorage point.
Never attempt to use a seat belt for more than one person, not even for small children.
Seat belts should be adjusted as firmly as possible, consistent with comfort, to provide the protection for which they have been designed. A slack belt will greatly reduce the protection afforded to the wearer.



ST088

INERTIA REEL SEAT BELT - Fig. ST088
To fasten, draw the tongue of the belt over the shoulder and across the chest, then push it into the engagement/release slot. A positive click indicates that the belt is safely locked. To release, press the release button which will automatically disengage the buckle; this allows the belt to retract. Position the moveable clip as high as possible so that the tongue is accessible when the belt is next required.

NOTE: If a vehicle is parked on unlevel ground, the seat belt mechanism may lock. This is not a fault, ease the belt from its attachment to fit.



ST242

LAP SEAT BELT - Fig. ST242
The lap belt is fastened and released in the same way as the inertia reel type. To adjust, slide the adjuster along the belt and feed the webbing through the buckle until the belt is comfortably tight. When not in use, lap belts should be fastened.

TESTING INERTIA REEL TYPE SEAT BELT

WARNING: This test must be carried out under safe road conditions, that is, level dry road with no following or oncoming traffic.

With the seat belt in use, drive the vehicle at 8 kph (5 mph) and brake sharply. The automatic locking device should operate and lock the belt. It is essential that the driver and passenger are sitting in a normal relaxed position when making the test. The retarding effect of the braking must not be anticipated. If the belt fails to lock on test, consult a Land Rover Dealer.

CARE OF THE SEAT BELT

The seat belts fitted to this vehicle represent valuable and possible life saving equipment, which should be regarded with the same importance as steering and brake systems. Frequent inspection is advised to ensure continued effectiveness in the event of an accident.
Inspect the belt webbing periodically for signs of abrasion or wear, paying particular attention to the fixing points. DO NOT attempt to make any alterations or additions to the belts or their fixings as this could impair their efficiency.
If correctly worn and stowed when not in use, on the stowage points provided, deterioration will be kept to a minimum and protection to a maximum.

Seat belt assemblies must be replaced if the vehicle has been involved in an accident of if upon inspection, there is evidence of cutting or fraying of the webbing, incorrect buckle or tongue locking function; and/or any damage to the buckle stalk cabling.

SEAT BELT CLEANING

DO NOT attempt to bleach the belt webbing or re-dye it. If the webbing becomes soiled: sponge with warm water using a non-detergent soap and allow to dry naturally. DO NOT use caustic soap, chemical cleaners or detergents for cleaning; do not dry with artificial heat or by direct exposure to the sun.

Infant and child restraints - Estate models

When installing and using any infant or child restraint system, always follow the instructions provided by the manufacturer concerning its installation and use.
The failure to properly secure the child restraint system in the vehicle can endanger the child in the event of a collision or sudden stop and cause injury to other passengers. The centre rear seating position is fitted with lap belts which can be manually tightened to secure the infant or child restraint system. Older children should use the lap/shoulder belt.

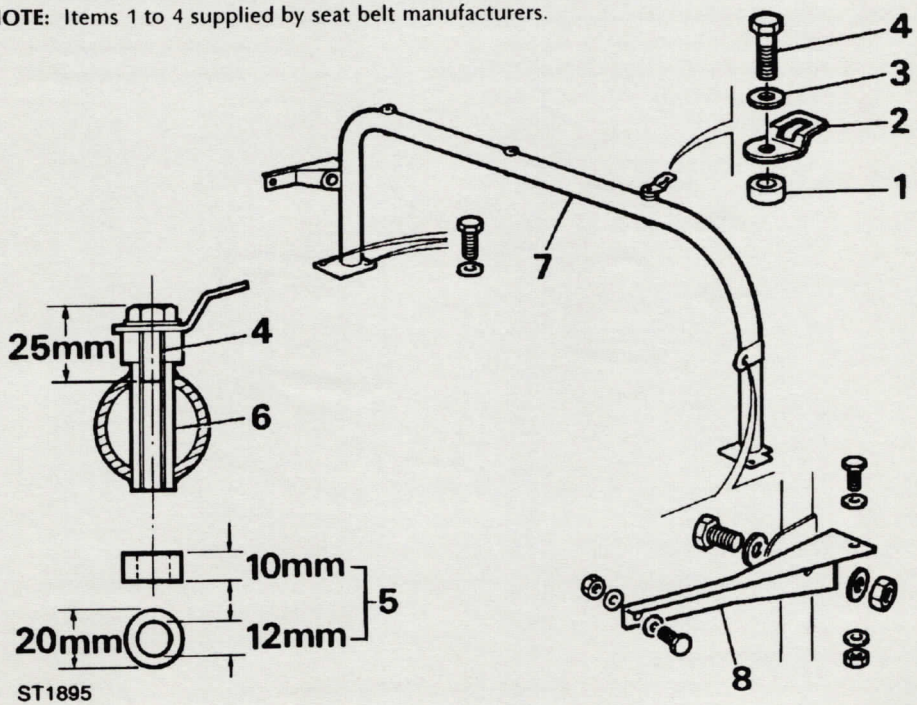
CHILD RESTRAINT UPPER ANCHORAGES - FORWARD FACING REAR SEATS. AUSTRALIAN DESIGN RULE NUMBER 34A - Fig. ST1895

WARNING: Child restraint anchorages are designed to withstand only those loads imposed by correctly fitted child restraints.
Under no circumstances are they to be used for adult seat belts or harnesses.
Child restraints are designed to bear upon the bony structure of the body as they are the seat belts for adults.

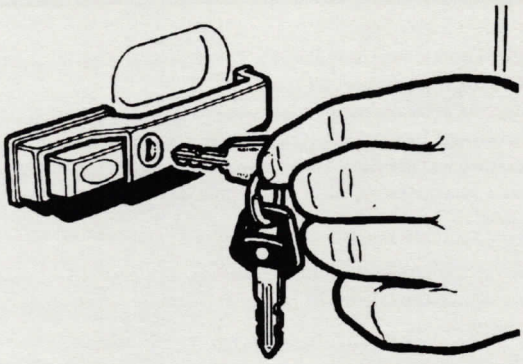
The method of fixing the upper anchorage fittings, dimensions of spacers required and length of bolts are shown opposite. The child restraint must be fitted in accordance with the seat belt manufacturer's instructions.

1. Spacer.
2. Upper anchorage fitting.
3. Plain washer.
4. Securing bolt, minimum length.
5. Spacer dimensions.
6. 5/16-18 UNC-2B threaded tube welded into mounting bar.
7. Seat belt mounting bar.
8. Mounting bar fixing to vehicle.

NOTE: Items 1 to 4 supplied by seat belt manufacturers.



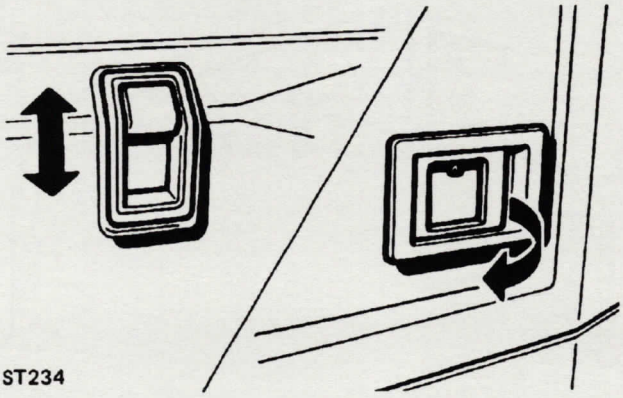
ST1895



ST233

DOOR LOCK OPERATION

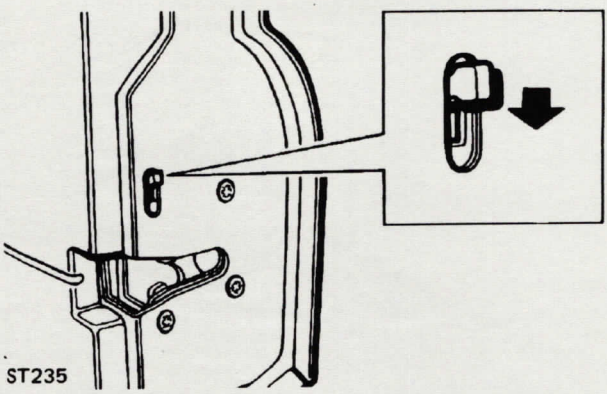
FROM OUTSIDE - Fig. ST233
To lock a front door, turn the key rearward a quarter of a turn, return the key to the vertical position and remove it. To lock a front door without using a key (Take care not to leave the keys inside the vehicle). Hold the external release button in and depress the interior locking button, release the external button and close the door. To unlock a front door, insert the key and turn it forward a quarter of a turn, return the key to the vertical position and remove it. To lock a rear side door - One Ten Station Wagons - push down the interior locking button. This can be done with door open or closed.



ST234

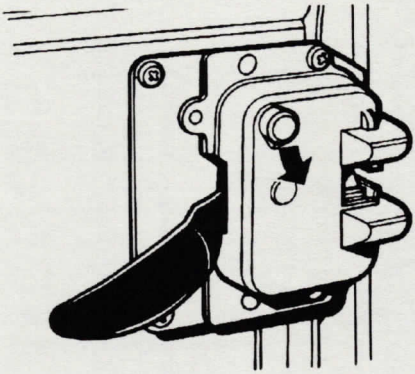
FROM INSIDE - Fig. ST234
To lock any door, push down the interior locking button. To unlock any door, pull the interior locking button.

WINDOWS (SIDE DOORS)
To raise or lower the door windows turn the handle either to the right or left in a circular motion, as required.



CHILD PROOF LOCKING - 'ONE TEN' STATION WAGON REAR SIDE DOORS - Fig. ST235
Each rear side door is fitted with a child proof lock. Move the setting lever down to prevent the door being opened from inside the vehicle.

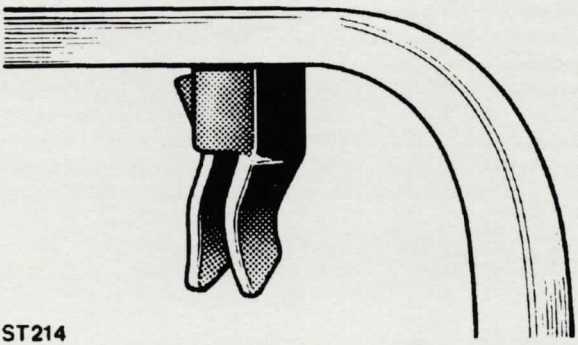
REAR DOOR - HARD TOP MODELS AND STATION WAGONS - FROM OUTSIDE
To unlock the door, insert the key and turn it clockwise a quarter of a turn, return the key to the vertical position and remove it. To open the door, simply lift the outside handle. When the door is fully opened, a catch automatically retains the check strap and holds the door in the open position. To close the door, simply pull it towards the closed position (the check strap automatically releases). To lock the door, insert the key and turn it anti-clockwise a quarter of a turn, return the key to the vertical position and remove it.



ST237

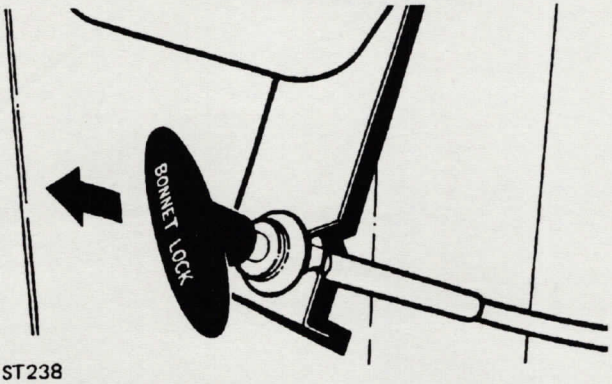
DOOR LOCK OPERATION - HARD TOP MODELS AND STATION WAGONS

FROM INSIDE - Fig. ST237
To unlock the door move the knob on the lock case downwards. Open the door using the inside handle. To lock the door, move the knob on the lock case upwards after closing the door.



ST214

REAR SIDE WINDOWS - SLIDING TYPE (option) - Fig. ST214
The forward section of the sliding type rear side windows can be opened as required for rear passenger ventilation. Each window is controlled by a single catch. To open, press the catch tongues together, slide the window to the desired aperture position and release the catch which will automatically lock the windows in position.

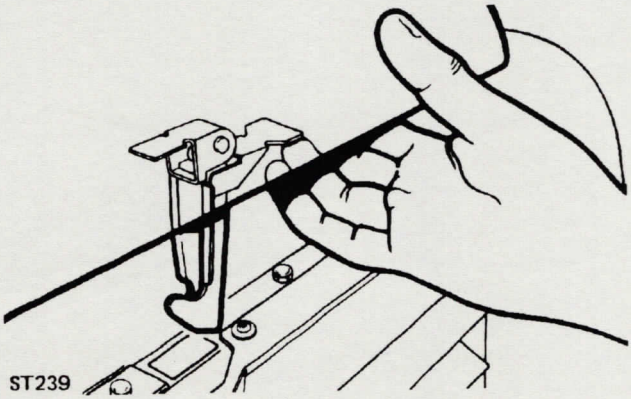


ST238

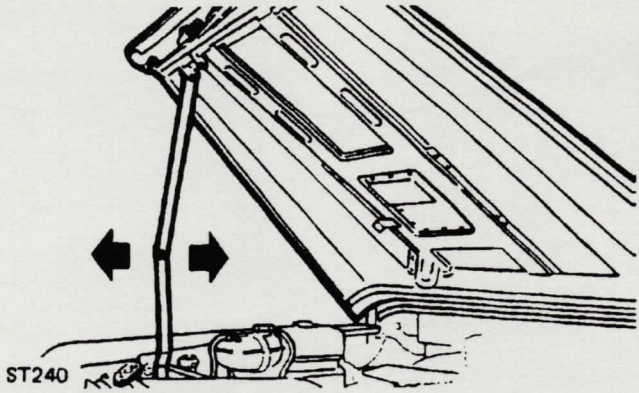
BONNET Figs. ST238, ST239 AND ST240

WARNING: If the spare wheel is fitted on the bonnet, it will be heavy to lift; DO NOT allow it to drop.

The bonnet release is located under the dash, to the right of the gearbox tunnel - Fig. ST238. To release the bonnet catch, pull the bonnet release handle. From outside the front of the vehicle, lift the safety catch lever and raise the bonnet - Fig. ST239. Pull the support stay forward to secure the bonnet in the open position - Fig. ST240. Ensure that the stay has locked in position, to prevent the bonnet accidently falling down. To close, raise the bonnet slightly, support it while pushing back the support stay, and lower the bonnet. Press down on the forward edge of the bonnet with the hands to engage the lock.



ST239

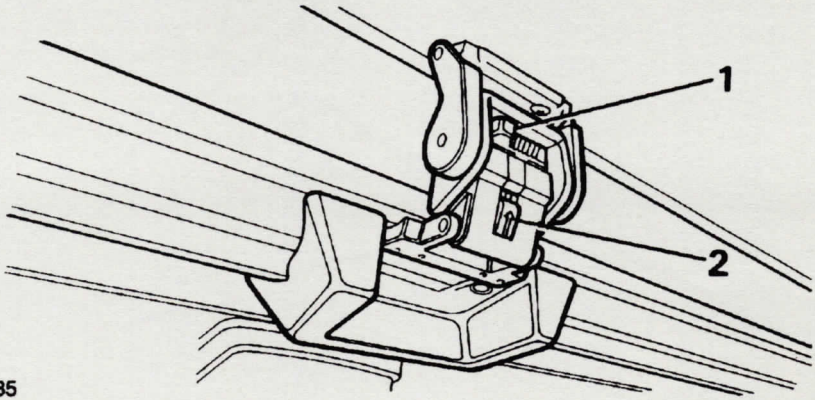


SUN ROOF - Option
The sun roof can be partially opened in three different positions for varying amounts of ventilation or, it can be removed completely for maximum effect.

CAUTION: DO NOT store the sun roof loose in the vehicle.

TO OPEN THE SUN ROOF - Fig. ST285

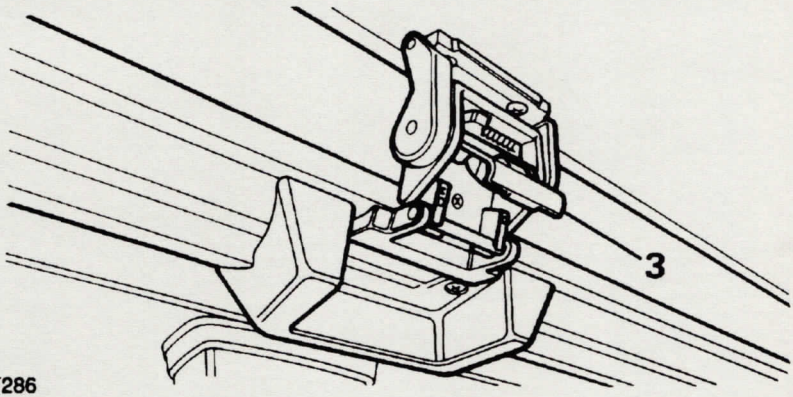
Pull the handle forward until it locks in the first position. By pressing the green knob (1) sideways, the handle can be pulled further forward to the second and third positions. To close the sun roof, press the green knob sideways and push the handle fully back.



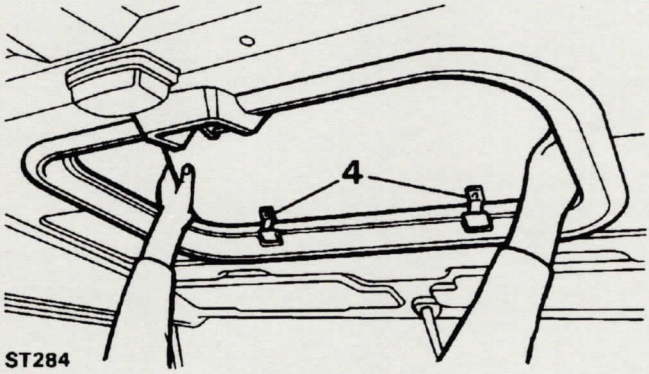
ST285

TO REMOVE THE SUN ROOF - Fig. ST286 and ST284

Open the sun roof to the third position, then push the red knob (2) up and pull the base of the handle (3) forward to unclip it from its mounting. Lift the sun roof forwards until the two locating lugs (4) are clear of the roof.
To refit, locate the two lugs in the roof, connect the handle to its mounting and pull the handle rearwards to close the roof.



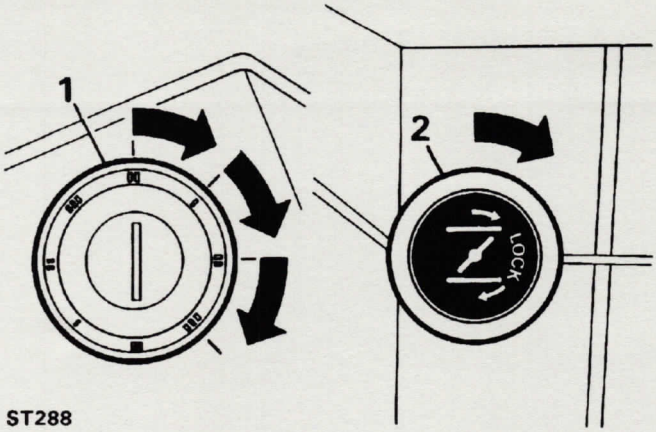
ST286



ST284

DRIVING AND OPERATING

3



ST288

STARTING - PETROL ENGINE - Fig. ST288
Before starting the engine for the first time each day, check that the engine oil and radiator coolant levels are correct, top up if necessary. Check that the handbrake is on and that the main gear lever is in neutral. If the the engine is cold, pull out the cold start control (2) and turn it clockwise to lock.

STARTER OPERATION
Insert and turn the ignition key to position 'II', then turn the key to position 'III' to operate the starter; release the key as soon as the engine is running. The RED ignition and oil pressure warning lights will go out when the engine is running.

In cold weather, depress the clutch pedal while the starter motor is in operation to improve engine starting speed.

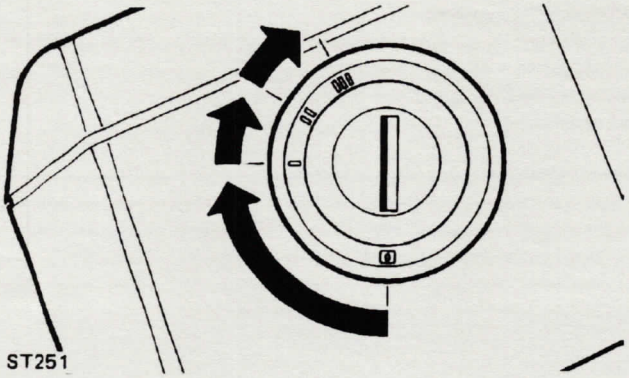
Do not operate the starter for longer than 10 seconds; switch off and wait 10 seconds before re-using the starter. If the cold start control has been used to assist starting, unlock the control by turning it anti-clockwise and push it in to the mid-point of its travel and relock. As the engine warms and runs smoothly, progressively return the control to the fully in position. If after a few attempts the engine fails to start, switch off and investigate the cause.

CAUTION: Continued use of the starter will not only discharge the battery but may damage the starter motor.

STARTING WITH A WARM ENGINE

DO NOT use the cold start control or pump the accelerator pedal. Depress the accelerator pedal to approximately half-way. Turn the ignition key to operate the starter, keeping the accelerator pedal in the half-way position. Release the ignition key and accelerator pedal immediately the engine starts.

WARNING: Carbon monoxide is a dangerous gas and can cause unconsciousness and may even be fatal. Do not breathe exhaust gas because it contains carbon monoxide which by itself has no colour or odour. Never start or leave the engine running in an enclosed unventilated area. If you think exhaust fumes are entering the vehicle have the cause determined and corrected as soon as possible. If you must drive under these conditions, drive only with all windows fully open.



STARTING AND STOPPING - DIESEL ENGINE - Fig. ST251
The following procedures must be used to ensure easy starting and avoid damage to turbo-charged models.
Before starting the engine for the first time each day, check that the engine oil and radiator coolant levels are correct, top up if necessary. Check that the handbrake is on and that the main gear lever is in neutral.

HEATER PLUGS
The Land Rover diesel engine will start satisfactorily, with the proper use of the heater plugs, down to temperatures of -32°C (22°F) even with batteries only 80% charged, provided the correct grade of oil is used. Turn the starter key to the heater plug position (II) when starting from cold. An amber warning light will glow when the engine starter key is turned to the 'heater plug' position, and will go off after a few seconds when the starting temperature is correct.

STARTER OPERATION
Insert the starter key and turn and hold it in position 'II' until the heater plug warning light goes off, then turn the key to position 'III' to operate the starter; release the key as soon as the engined is running. The RED charge and oil pressure warning lights will go out when the engine is running.

STARTING A COLD ENGINE
DO NOT use the accelerator pedal during the engine starting procedure; extra fuel for cold starting is automatically supplied by the injector pump.

CAUTION: The engine must not be run above fast idle until the oil pressure warning light goes off; this is to ensure that the engine bearings are receiving lubrication before being run at speed. This is very important on turbo-charged engines to ensure that the turbo-charger bearings are also receiving lubrication.

In cold weather, depress the clutch pedal while the starter motor is in operation to improve engine starting speed.
Do not operate the starter for longer than 10 seconds; switch off and wait 10 seconds before re-using the starter. If after a few attempts the engine fails to start, switch off and investigate the cause.

CAUTION: Continued use of the starter will not only discharge the battery but may damage the starter motor.

STOPPING THE ENGINE - TURBO-CHARGED MODEL
To avoid the possibility of inadequate lubrication of the turbo-charger, the following precaution must always be observed.

- Before stopping the engine, allow it to idle for 10 seconds to give time for the turbo-charger to slow down whilst oil pressure is available at the bearings.
- Switching the engine off too quickly could leave the turbine rotating at several thousand revolutionsper minute without oil pressure.

STARTING A WARM ENGINE
DO NOT operate the accelerator pedal during the engine starting procedure. Turn the starter key to the engine start position. Release the key immediately the engine starts.

PRECAUTIONS FOR COLD WEATHER PROTECTION
The following recommendations should be considered to minimize difficulties associated with cold weather fuel problems.

- Ensure 'winter' grade fuel is used. Filling stations should automatically change to this fuel during winter.
- Renew the main fuel filter element at the recommended intervals.
- Maintain the state of charge of the battery in a satisfactory condition.
- Follow the starting procedures stated.

The use of paraffin (kerosene) as a diesel fuel additive, is illegal in the U.K. and the use of petrol as a fuel in a diesel engine is highly dangerous.

WARNING: Exhaust fumes contain noxious substances which can cause unconsciousness and may even be fatal. Do not breathe exhaust gas because it contains noxious substances which by itself has no colour or odour. Never start or leave the engine running in an enclosed unventilated area. If you think exhaust fumes are entering the vehicle have the cause determined and corrected as soon as possible. If you must drive under these conditions, drive only with all windows fully open.

ENGINE STARTING FAULT FINDING - PETROL AND DIESEL ENGINES

This chart gives a number of quick and easy checks which may help you to get the engine started.

Checking of any part of the electronic ignition system must be referred to your Land Rover Dealer or Distributor.

WARNING: The electronic ignition system involves very high voltages. Inexperienced personnel and wearers of medical pacemaker devices should not be allowed near any part of the high-tension circuit.

FAULT	POSSIBLE CAUSE	CHECK
STARTER MOTOR WILL NOT OPERATE		
If the starter motor does not operate when the key is turned to the start position,	1.	1.
	Loose battery leads	Clean and tighten the battery lead connections and try starting the engine.
the fault may be -	2. Discharged battery	2. Try push or tow starting the vehicle
	3. Faulty wiring	3. 3, 4 and 5, seek expert help.
	4. Faulty starter solenoid	
	5. Faulty starter motor	
STARTER MOTOR OPERATES BUT ENGINE WILL NOT START		
Do not use the starter motor for long periods, if the engine will not start, the fault may be -	1. Lack of fuel	1. The fuel gauge could be faulty. Check that there is fuel in the tank.
	2 Fuel not reaching engine	2a Slacken a fuel pipe nut at the engine and operate the starter for a few seconds. If fuel has leaked from the slackened nut, then fuel is reaching the engine. Retighten the fuel pipe nut and wipe away any fuel.
		b If fuel has not leaked, check for broken or disconnected pipes.
		c If the fault is not found, seek expert help.

CAUTION: If the vehicle runs out of fuel or the engine will not start, turn off the ignition/starter switch to prevent damage to electrical components.

FAULT	POSSIBLE CAUSE	CHECK
	3. Petrol engines-Ignition fault Diesel engines-Heater plug fault	3. **PETROL ENGINES:** Remove one spark plug. Reconnect its lead and place it on the engine so that there is a metal-to-metal contact. Operate the starter while someone else looks to see if the plug sparks. If a spark is seen, ignition fault is unlikely. Refit the plug and make sure that the leads are connected in the right order, as shown in this manual. If no spark is seen, refit the plug, as above, and make sure that all the leads are firmly connected to the distributor cap, and that the centre lead is firmly connected to the ignition coil. Try starting the engine again. If the engine does not start, remove the distributor cap and wipe the inside to remove any damp or dirt. Four cylinder engines only: Check and adjust the contact breaker clearance, as described in this manual. Refit the distributor cap and try starting the engine again. If the engine does not start, seek expert help. **DIESEL ENGINES:** Make sure that the yellow/black leads are firmly connected to all four heater plugs, and that the plug and socket is firmly connected on the timer unit at the rear of the engine compartment. Hold the starter key in the 'heater plug' position for at least twelve seconds, then try to start the engine. If the engine does not start, seek expert help.

DRIVING - PETROL AND DIESEL MODELS

WARMING-UP

When the engine is cold, drive the car as soon as the engine has started. Do not warm-up the engine by running it at a slow speed with the vehicle stationary.

CAUTION: Harsh acceleration and labouring the engine before normal temperature is reached can damage the engine.

EXCESSIVE TEMPERATURE

Excessive engine temperature is indicated when the temperature gauge indicator reaches the RED graduations. Any sudden increase in engine temperature must be investigated. Stop the engine and check the engine cooling system.

WARNING: Do not remove the filler cap or radiator filler plug when the engine is hot because the cooling system is pressurised and personal scalding could result.

Ensure there are no leaks, top up the radiator expansion tank if necessary. Make sure the fan belt is not broken and is correctly tensioned.

DRIVING CHARACTERISTICS

WARNING: Your Land Rover has a higher ground clearance and hence a higher centre of gravity than an ordinary passenger car to enable it to perform in a wide variety of off-road applications. An abrupt manoeuvre at an inappropriate speed or on an unsuitable surface could cause the Land Rover to go out of control.

RUNNING-IN PERIOD

Progressive running-in of a new Land Rover is important and has a direct bearing on reliability and smooth running throughout its life.
The most important point is not to hold the vehicle on large throttle opening for any sustained periods. To start with, the maximum speed should be limited to 65 to 80 km/h (40 to 50 mph) for 4 cylinder models and 80 to 95 km/h (50 to 60 mph) for V8 cylinder models, on a light throttle and this may be progressively increased over the first 2.500 km (1,500 miles).

FUEL RECOMMENDATIONS

Recommended fuels for petrol models are specified in the Data section. No advantage will be gained by the use of higher octane fuels. The fuel filler cap is located: Side tank: at the front right-hand side of the body. Rear tank: at the rear right-hand side of the body.

UNLEADED PETROL

All current petrol engines used in Land Rovers, 4 cylinder and V8, can be run on unleaded or leaded petrol. It is strongly recommended, that whenever it is available, unleaded petrol should be used to help protect the environment. It is permissible to mix unleaded and leaded petrol when refilling the petrol tank.

V8 PETROL ENGINES ONLY - If your vehicle is fitted with a low emission exhaust system, or if you intend purchasing a conversion kit from Land Rover Parts, the following important points should be noted. Always use **UNLEADED** (95 octane) petrol. Note the cautionary and instruction labels fitted to the vehicle, specifying the use of **UNLEADED** fuel only.

CAUTION: NEVER put any **LEADED** petrol in the fuel tank, as it would completely destroy the emission reducing properties of the catalyst exhaust.

CAUTION: Do not use oxygenated fuels such as blends of methanol/gasoline or ethanol/gasoline (e.g. Gasohol).

WARNING: Do not fill the tank completely if the vehicle is to be parked in direct sunlight or high ambient temperature, as this would cause the fuel to expand and escape through the breather pipe onto the ground.

- DIESEL ENGINES
Clean, good quality fuel should be used in diesel models. It is important that the sulphur content of diesel fuel does not exceed 1%. In Europe all supplies should be within the limit, but in other areas operators should check with their suppliers. Change the fuel filter element and clean sediment bowl regularly.

BRAKE, SERVO ASSISTANCE AND POWER ASSISTED STEERING - options
Do not coast in neutral with the engine switched off as the brake servo and power assistance for the steering will not operate. The brakes and steering will still function but more effort will be required by the driver. This will also apply if the vehicle is being towed without the engine running, and extra caution must be used.

SNOW CHAINS
Chains may be fitted to provide increased traction during extremely adverse heavy snow conditions. Never fit chains to one wheel only, always fit snow chains in pairs to the rear axle only, and ensure the gearbox differential control is in the LOCKED position. Remove the snow chains immediately the road is clear of snow.

Tdi ENGINES
If a radiator blind is fitted, it must not obscure the intercooler section, otherwise engine performance would be adversely affected. If in doubt, contact a Land Rover Dealer.

Driving in general

WARNING: Always wear a seat belt for personal protection while either ON-ROAD or OFF-ROAD driving. Driving off-road can be particularly hazardous therefore do not take risks. Drive carefully.

Do not use the handbrake while the vehicle is moving.
Do not rest your foot on the brake pedal while travelling as this may overheat the brakes, reduce their efficiency and cause excessive wear.
Do not overload the vehicle for sustained cross country work. See 'Vehicle weights' Section 6.
Do not wrap your thumbs round the steering wheel as any steering kick-back over rough ground may result in personal injury.
Do not coast with the engine switched off as the brake servo and steering assistance will not operate. The brakes will still function but more foot pressure will be required.

WARNING: Driving through water or heavy rain will result in braking surfaces becoming coated with moisture. This will affect braking efficiency until the surfaces are dried by intermittent light application of the brakes which should be done at a safe distance from other vehicles. Brakes should be dried and tested immediately after driving through water, every few miles when driving in heavy rain and especially before leaving a wet motorway. When parking, do not rely on the handbrake alone to hold the vehicle if the brake linings have been subjected to immersion in mud and water (See 'After wading' details later in this section).

Do not use a gear which is too high for the vehicle speed and travel conditions involved; it is preferable to select a lower gear and use more revolutions rather than allow the engine to labour at low speed.
Do not use the clutch pedal as a foot rest. Keep the left foot well clear of the clutch pedal while the vehicle is in motion.

DO NOT drive with your hand resting on the main gear level, it may damage the gearbox. Ensure pressure is only applied whilst changing gear.

TOWING

Consult a Land Rover Dealer for details and advice on approved towing equipment and accessories.

Land Rovers can tow loads over various types of terrain.

The torque ranges of Land Rover engines allow maximum-weight loads to be driven smoothly from standstill, and reduces gear changing on hills, or rough terrain. A smooth start will be achieved with trailers over 2000 kg (4400 lb) by moving off in low range then changing to high range while on the move.

The suspension is designed to cope with a heavy trailer load without upsetting the balance or feel of the vehicle. Details of gross maximum trailer weights are listed on the following page.

When preparing the vehicle and trailer combination, careful attention must be paid to the trailer manufacturer's recommendations. An outline of the correct procedure is given here:

(a) Vehicle tyre pressures must always be set at normal pressures, NOT the 'reduced for comfort' option, irrespective of the load being carried. See 'Tyre pressures' in Data Section.

(b) Adjust tyre pressures on the trailer, as recommended by the manufacturer.

(c) Balance the trailer and the vehicle, both unladen, so that the trailer draw-bar and the hitch point on the vehicle are at the same height. Adjust the height of the hitch point if necessary.

(d) Check operation of trailer brakes and lights.

(e) Load the trailer and check the weight on the hitch point (called the drawbar loading weight, or nose weight), in accordance with the manufacturer's recommendations.

(f) The recommended nose weight limit is 75 kg (165 lb). The nose weight plus the load areaand/or rear seats of the vehicle together with load and passengers must never exceed the maximum rear axle load or gross vehicle weight.

The weight of the trailer plus load depends upon several factors.

(a) Towing stability.

(b) Weight of the vehicle contents including passengers. When part of the weight is transferable, loading the towing vehicle will generally improve the stability of the combination.

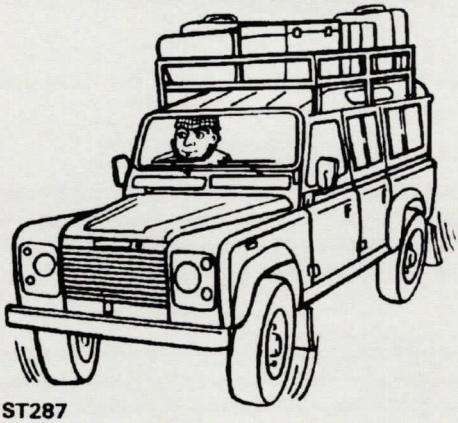
(c) Altitude: Engine performance is progressively reduced above altitudes of 300 m (1,000 feet).

NOTE: Since towing regulations vary from country to country, it is important to refer to the relevant national motoring organisations for the laws relating to towing weights and speed limits.
The following maximum permissible towed weights refer to the design limitations.

Maximum Permissible Towed Weights		**On-road kg**	**Off-road kg**
Unbraked trailers		750	500
Trailers with overrun brakes		3500	1000
4 wheel trailers with coupled brakes	Diesel models **(except Turbo)**	3500	1000
	* Petrol and Diesel Turbo	4000	1000

*** NOTE: In order to tow a trailer with a weight in excess of 3,500 Kg, it is necessary to adapt the vehicle to operate a Coupled Brake System, and the VIN plate must be changed to show the increased train weight.**

A revised VIN plate may be obtained from Land Rover, which will be issued, subject to satisfactory proof that the vehicle has been fitted with an approved conversion.



ST287

ROOF LOADS Fig. ST287

All new, 'Hard Top' Land Rovers, except cab trucks, have roofs fitted with aluminium cant rails, which require the use of an appropriate roof rack. Information concerning suitable roof racks is available through the Land Rover parts service. These should be fitted very carefully following the manufacturers' instructions.
Maximum roof load including weight of roof rack is 75 kg (165 lb).
In an extreme emergency this load may be increased to 150 kg (331 lb).

WARNING: When the use of a roof rack is required care should be taken as the vehicle stability will be affected. Any load must be evenly distributed and firmly secured. Drive carefully.

ACCESSORIES AND CONVERSIONS
Land Rover vehicles are designed and constructed for a variety of uses but no alterations or conversions should be carried out to any vehicle produced by Land Rover which could affect the safety of the vehicle or its passengers.
Land Rover has tested and approved a large number of accessories and conversions, suitable for the Ninety and One Ten vehicles in its current range. Before fitting **ANY** accessory or commencing **ANY** conversion work to any Land Rover vehicle, **CHECK** that the accessory or conversion is approved by Land Rover.

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.

CAUTION: DO NOT use auxiliary devices, 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.

DRIVING OFF ROAD

The following notes are ageneral guide to the technique of driving Land Rovers over rough terrain.

WARNING: Driving off road can be hazardous. DO NOT take unnecessary risks. Drive carefully and be prepared for emergencies.

MATCH ENGINE SPEED TO THE GEAR SELECTED

Before traversing a difficult section, select low range differential locked and a suitable gear, which, for most purposes, second or third is satisfactory. Remain in this gear whilst crossing and use care when applying the accelerator pedal since a sudden power surge may cause wheel spin. Unlock the differential as soon as practical.

RIDING THE CLUTCH

Keep the foot away from the clutch pedal. The practice of resting the foot on the clutch pedal should be avoided. Apart from premature clutch wear a sudden bump could cause the pedal to be depressed too far, disengaging the drive, and causing the vehicle to go out of control.

BRAKING

Keep the application of the brake pedal to a minimum.
Braking on wet or muddy slopes can induce sliding and loss of control.

USE OF ENGINE FOR BRAKING

Before descending steep slopes, first gear low range with differential locked should be selected and the engine should be allowed to provide the braking. This it will do without assistance from the wheel brakes. Failure to adopt this procedure may result in loss of control.

DRIVING ON SOFT GROUND

Where conditions are soft, such as marsh ground or sand, reduced tyre pressures will increase the contact area of the tyres with the ground. This will help to improve traction and reduce the tendency to sink. Tyre pressures should be reinflated to the standard pressures when firm ground is reached.

ROUGH ROCKY TRACKS

Although beaten rough tracks can be negotiated in normal drive, it is advisable to lock the differential if there is excessive suspension movement likely to induce wheel spin. As the track becomes rougher and more rocky, low range may be necessary to avoid slipping the clutch and to make the Land Rover easier to control. Do not hold the steering wheel with the fingers and thumbs inside the wheel. A sudden violent kick of the wheel could damage or even break the fingers. Grip the wheel on the outside of the rim when travelling across country, see Fig. ST027

CLIMBING STEEP SLOPES

This will usually require the use of low range second or third gear with differential locked. Should the slope be slippery use the highest gear that the engine can manage without labouring and stalling.

If the vehicle fails to climb a slope but does not stall, the following procedure should be carried out. Hold the vehicle on the footbrake and engage reverse gear as quickly as possible. Release the brakes and allow vehicle to reverse down the slope whilst ensuring that both feet are clear of the brake and clutch pedals.

If the vehicle stalls on a slope, hold the Land Rover on the footbrake, engage reverse gear and remove the feet from both clutch and brake pedals. Start the engine whilst in gear and allow the Land Rover to reverse down the slope, using only the retardation effect of the engine for braking.

When back on level ground, or where forward traction can be regained, then a possible faster approach will overcome the inertia and extra momentum will often enable the slope to be climbed.

ST374

GROUND CLEARANCE

Be aware of the need to maintain ground clearance under the chassis and a clear approach and departure angle. Avoid existing deep wheel ruts, sudden changes in slope and obstacles which could interfere with the chassis.

RUTTED AND EXISTING WHEEL TRACKS

Generally the tendancy is to over-steer the vehicle under these circumstances, resulting in the vehicle being driven on left- or right-hand lock in ruts. This should be avoided as it produces drag at the road wheels and can be dangerous, causing the vehicle to veer off the track the moment the front wheels reach level ground or find traction.

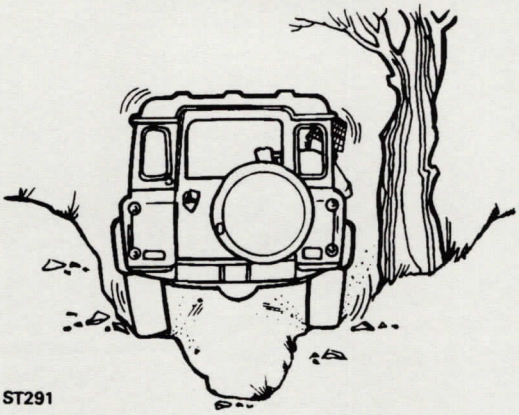
ST292

CROSSING RIDGES AND DITCHES - Fig. ST292
Select a path so that the condition under each wheel is similar to that under the opposite wheel of the same axle. This principle should be applied both in avoiding dissimilar ground surfaces under opposite wheels and in assessing the correct angle of approach to an obstacle so as to avoid the wheels being lifted off the ground.

CROSSING OVER A RIDGE
Approach a ridge at right angles so that both front wheels go over together. If approached at an angle, traction can be completely lost through diagonally opposite wheels leaving the ground.

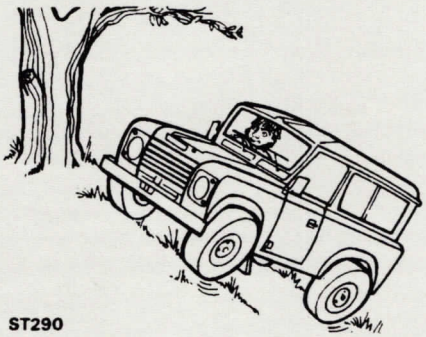
ST289

CROSSING A DITCH - Fig. ST289
Ditches should be crossed at an angle so that three wheels are kept in contact with the ground. If approached at right angles the two front wheels will drop into the ditch, effectively preventing forward or rearward movement.



ST291

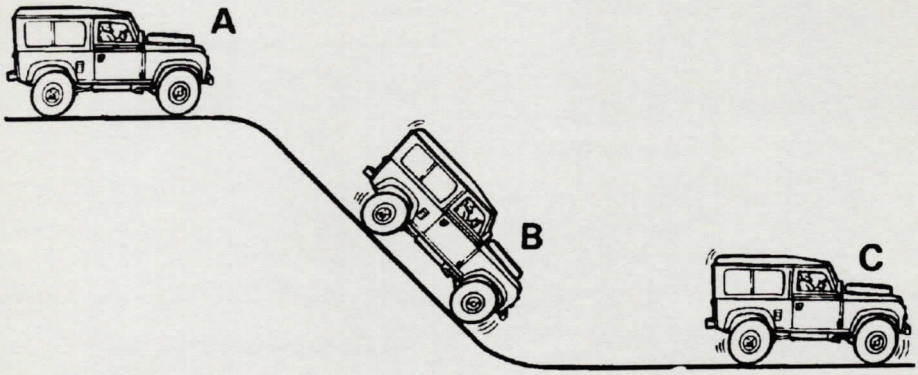
NEGOTIATING A 'V' SHAPED GULLY - Fig. ST291
This should be tackled with caution since steering up or down the gully walls could lead to the vehicle becoming trapped on the bank or on an obstacle such as a tree or rock.



ST290

TRAVERSING SLOPES - Fig. ST290
Traversing a slope should be undertaken in the following way. Check that the ground is firm under all wheels and that it is not soft under the downhill side wheels. Also avoid the uppermost wheels climbing up over a rock or tree root, both of these situations could result in the vehicle rolling on to its side.

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



ST293

DESCENDING STEEP SLOPES - Fig. ST293
Stop the vehicle at least a vehicles length before the slope and engage first gear, low range with the differential locked. Check gear engagement before moving off. Do not touch the brake or clutch during the descent - the engine will limit the speed, and the vehicle will remain perfectly under control while the front wheels are turning. If the vehicle begins to slide, accelerate to maintain directional stability.

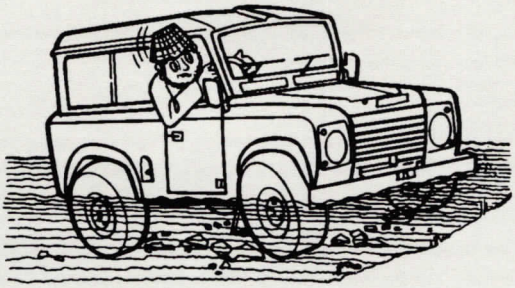
A. Stop at least a vehicles length before the slope. Select first gear low range with the differential locked.
B. Engine retardation.
C. Now unlock differential and change into second or third gear.

DRIVING IN SOFT, DRY SAND
When conditions are soft, reduced tyre pressures will increase the contact area, help improve traction and reduce the tendency to sink. Select a gear, lock the differential and stay in it.

Because of the drag of the sand, the instant the clutch is disengaged the vehicle will stop. If a standing start in sand or on the side of dunes is necessary, exercise care in applying the accelerator pedal, as sudden power will induce wheel spin and cause the vehicle to dig itself into trouble.

ICE AND SNOW
Land Rovers are, of course, used extensively in snow and icy conditions. The driving techniques are generally the same as driving on mud or wet grass. Select the highest gear possible with the differential locked and use only sufficient engine revolutions to just move the vehicle forward without labouring. Avoid violent movements of the steering wheel and use the brakes, with care, only if necessary.

NOTE: The differential lock can be engaged or disengaged at any speed providing the road wheels are not spinning at different revolutions. For example, in slippery conditions if one wheel is spinning, ease off the accelerator before engagement.



ST294

WADING - Fig. ST294

The maximum advisable wading depth is approximately 0,5 metres (20 in). Before wading make sure that the timing cover drain plug fitted to the diesel model only; and the flywheel housing drain plug are in position, see Maintenance Section, and if the water is deep, slacken off the fan belt. To prevent saturation of the electrical system and air intake, avoid excessive engine speed. A low gear with the differential locked is desirable and sufficient throttle should be maintained to avoid stalling if the exhaust pipe is under water.

AFTER BEING IN WATER

Make sure that the brakes are dried out immediately so that they are fully effective when needed again. This can be accomplished by driving a short distance with the footbrake applied. Also re-tighten and adjust the fan belt, remove the flywheel housing drain plug and, on diesel models remove the timing cover drain plug see Maintenance Section for these operations.

Do not rely on the handbrake to hold the vehicle once the transmission brake has been subjected to mud and water; leave the vehicle parked in gear.

AFTER CROSS COUNTRY DRIVING

If the tyre pressures have been reduced, they MUST be restored to the normal recommended pressures as soon as reasonable road conditions or hard ground is reached.

WARNING: Before rejoining the highway (public metalled roads) or driving the vehicle at speeds above 40 km/h (25 mph), wheels and tyres must be inspected for damage, after cleaning off any mud. Do not forget the inside faces. Also, inspect the brake discs and calipers, and remove any stones or grit etc., that may have become lodged and affect the efficiency of the brakes.

VEHICLE RECOVERY

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

(a) Avoid prolonged wheel spin; this will only make matters worse.
(b) Try to remove obstacles rather than force the vehicle to cross them.
(c) If the ground is very soft, reduce tyre pressures if this has not previously been done.
(d) Clear clogged tyre treads.
(e) Reverse as far as possible, then the momentum reached in going forward again may get the vehicle over the obstacle.
(f) Brushwood, sacking, or any similar 'mat' material placed in front of the tyres will help in producing tyre grip.
(g) If possible, jack up the vehicle and place material under the wheels. Great care must be taken when doing this to avoid personal injury.

WINCHING

Land Rovers may be fitted with a variety of winches, suited to different functions. Their correct use is most important if accidents are to be avoided.

WINCH USE

A winch may be used for self-recovery, for recovering other vehicles or for a wide variety of haulage. When hauling with the vehicle stationary, ground anchors may be used to advantage.

WINCH OPERATION

Winches vary considerably in their mode of operation and the operator should refer to the manufacturer's instructions for his own model. The following is a general outline:
Apply handbrake
If recovering a motor vehicle or hauling another object, position ground anchors.
Prepare winch for operation and attach wire or fibre rope according to manufacturer's instructions.
Start vehicle engine as necessary, maintain revs required by instructions, and begin winching.
After winching, spool wire onto drum winches. Remove rope from capstan winches for storage elsewhere.

DO'S AND DON'TS

POINTS OF SAFETY

Safety is the most important consideration: ropes, and particularly wire ropes, will react with great force if they part and can cause very severe injury.

WARNING: Careless winch operation can result in serious injury or damage to property. Read and understand all safety precautions and operating instructions before operating a winch.

Never stand near a rope under tension and in particular never stand astride it. Wear suitable protective gloves particularly when handling wire rope to protect hands from broken strands. Never allow wire rope to kink, coil or overwrap. Do not attempt to continue winching if the winch has stalled through overload. If brass shear-pins are fitted, do not replace them with steel ones - if the pins do not shear, some other part of the winch may do so. After use, wire ropes must be cleaned and greased - hold a greasy or oily rag in a gloved hand and allow wire to pass through it. Synthetic rope should be cleaned and dried.

POWER TAKE-OFF DRIVES

GENERAL

The Land Rover Ninety and One Ten can provide a static or mobile power source for a wide range of ancilliary equipment. This power is available at two positions on the vehicle, one on the transfer box and the other at the front of the vehicle where a coupling may be made to the engine crankshaft.

The transfer gear unit consists of a centre power take off which can be obtained as optional equipment. This forms the basic drive for several variations for power take off layouts, summarised as follows:

Centre power take off	- V-belt pulley drive
	- Hydraulic drive
Front power take off	- Mechanical
Rear Power Take Off	- Hydraulic
	- Mechanical (ONE TEN ONLY)

For stationary operation the transfer gearbox is placed in neutral to disconnect the drive to the wheels and then it is possible to operate the centre power take off independently.

In this condition any of the forward gears may be used to provide a wide range of speeds. It is recommended that the highest gear should be used where ever possible as this will prevent excessive loading of the transmission. The intermediate gears can be selected when lower speeds are required, bu their use should be restricted to light loads and duties of an intermittent nature.

When the vehicle is moving, the centre power take off drive unit will operate at a speed which is in direct proportion to the road speed of the vehicle and the ratio of the transfer gear selected.

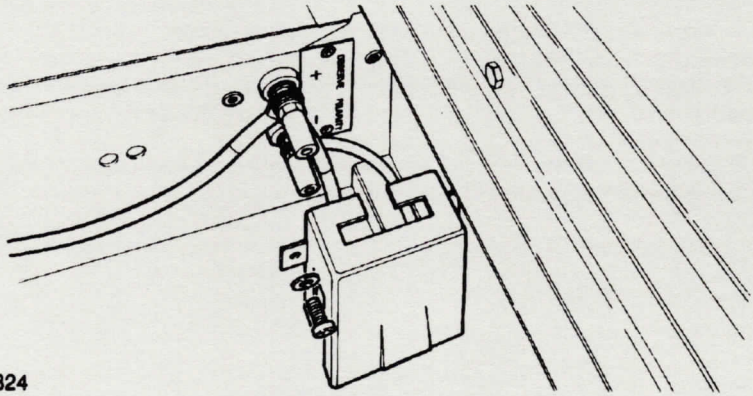
For more information on power take off drives and equipment, contact your Land Rover Dealer.

SPLIT CHARGE - OPTION - Fig. ST324
The split charge facility enables a second battery to be fitted to the vehicle charging circuit, to provide a separate source of 12 volt electrical supply for auxiliary use without risk of discharging the vehicle main battery.

TERMINAL BOX PICK UP ASSEMBLY
Positive (+) and Negative (-) terminals, located in the battery box, are used for battery charging purposes. The ammeter is connected in the + line in order to monitor the current flow from the alternator to the batteries. **IMPORTANT:** It is essential that when charging additional batteries the cables used must be capable of carrying the maximum rated output of the alternator. When charging more than one 12 volt battery interconnections between batteries must be parallel.

AUXILIARY ELECTRICAL POWER
When power is required for driving low voltage equipment with the engine running, connections can be made directly to the terminals "+" and "-".

CAUTION: Ensure that correct polarity is observed to avoid damage to the circuit and equipment.



ST324

VEHICLE RECOVERY - TOWED

If the vehicle should suffer a breakdown or accident damage and it becomes necessary to make a towed recovery, it is essential to adhere to one of the following procedures depending on the type of tow to be undertaken.
This is because Land Rovers have permanent four-wheel drive and may be fitted with a steering lock.

TOWING THE LAND ROVER (ON FOUR-WHEELS)

(a) Set the main gearbox in neutral.
(b) Set the transfer box in neutral.
(c) Turn the starter/steering lock key to the first position to unlock the steering.
(d) Ensure the differential lock is in the normal 'unlocked'position.
(e) Secure towing attachment to the vehicle.
(f) Release the handbrake.

NOTE: Unless the engine is running, brake servo (and power steering assistance, if fitted) will not be effective. This will result in a considerable increase in pedal pressure or steering effort being required.

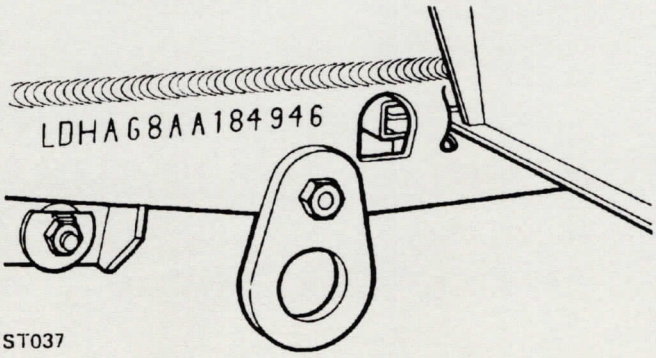
CAUTION: Where a front propeller shaft is to be removed check whether the four rear end fixing bolts in the gearbox flange are entered from the gearbox side. In this event they cannot readily be withdrawn. However, since the flange will revolve as soon as the vehicle is towed the four loose bolts MUST be tightly secured with nuts or suitably wired to prevent damage to the gearbox end casing.

SUSPENDED TOW BY BREAKDOWN VEHICLE

Disconnect the propeller shaft from the axle to be trailed; this is necessary as the vehicle has a permanent four-wheel drive. If the front axle is to be trailed it will also be necessary to turn the starter steering lock key to position 1 to unlock the steering.
The steering wheel and/or linkage MUST be secured in a straight ahead position.
The vehicle can then be attached to the breakdown vehicle and raised.

TRANSPORTING THE LAND ROVER ON A TRAILER - Fig. ST037

Lashing rings are available on the front and rear chassis members to facilitate the securing of the vehicle to a trailer.



ST037

DRIVERS MAINTENANCE

Section 4 includes information for the Driver, on the day-to-day maintenance requirements for the operation of the vehicle. The more comprehensive, 'Routine Maintenance', is described in Section 5, and should be done by trained mechanics in a suitable workshop.

4 DRIVERS MAINTENANCE

In addition to the Workshop Maintenance Schedules shown in Section 5, the following checks and adjustments should be carried out by the driver or operator, to ensure that the vehicle is ready for daily use.
Many of these tasks are described and illustrated in the following pages.
Recommended lubricants, fluids and quantities are stated in Section 6.

Daily or weekly, depending on operating conditions, and at least every 500 km (250 miles):-

Check/top up engine oil.
Check/top up radiator cooling system.
Check/top up windscreen washer reservoir.
Drain fuel sedimenter - Diesel only (where fitted).
Visually check the brake fluid reservoir. The fluid level must be above the 'MIN' mark.
DO NOT top up. If the level is low, obtain advice from a Land Rover Dealer.
Check/adjust tyre pressures.
Check tyres for wear or damage.
Check that the handbrake and footbrakes, operate normally.
Check operation of all lights and horn.

EXTERIOR LAMPS
Owners are under a legal obligation in many territories to maintain all exterior lights in good working order; this also applies to headlamp beam setting, which should be checked at regular intervals by your Distributor or Dealer.

BATTERY
The battery is fitted under the left side front seat and is a 'Low Maintenance' type that does not require any attention from the driver.

SPARE WHEEL
The spare wheel stowage position varies on different models as follows:
It can be mounted in a well in front of the rear wheel arch panel or on the rear door on station wagons.
It can also be fitted to the bonnet top panel on all models, using a specially adapted bonnet.

TOOLS
The small tools are carried in a locker, under the seat cushion. On some vehicles, the lifting jack is secured in clips on the seat backrest panel and is accessible with the seat backs lowered.

ENGINE OIL LEVEL - 4-CYLINDER PETROL AND DIESEL ENGINES EXCEPT Tdi - Fig. ST295

Check daily or weekly depending on operating conditions and at least every 500 km (250 miles). The oil level should not be allowed to fall below the 'L' (low) notch on the dipstick (1) located on the left-hand side of the engine.

Whenever possible, the oil level should be checked with the engine hot, as follows:

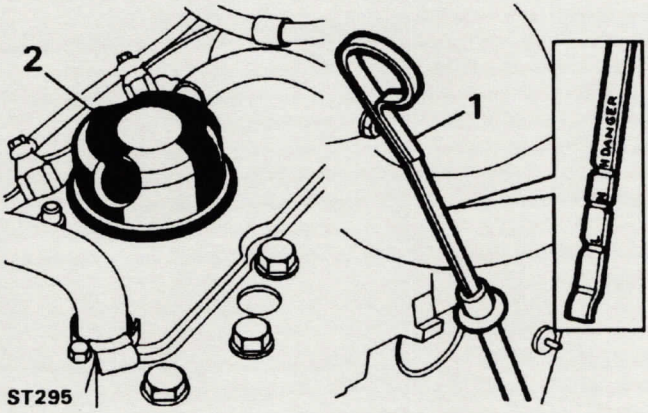
Stand the vehicle on level ground and wait at least five minutes, after the engine has stopped, for the oil to drain back into the engine sump.

Withdraw the dipstick (1) at the left-hand side of the engine, wipe it clean, re-insert it to its full depth and remove a second time to take a reading.

If oil level is between N and H (middle and upper notch) add no oil.

If oil level is between L and N (lower and middle notch) add one litre only of the correct grade oil through the push-on filler/breather cap (2) on the rocker cover.

If the oil level is below the 'L' notch, add one litre of oil and re-check the level after five minutes. Add further oil as necessary to raise the level between 'N' and 'H'. **DO NOT OVERFILL.** See DATA Section 6 for recommended engine oils.



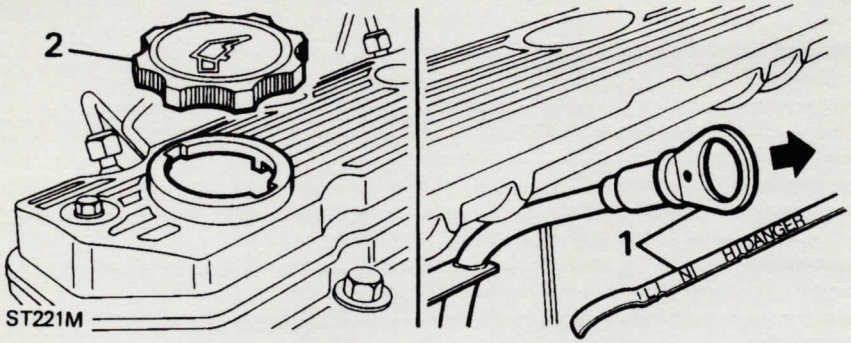
ST295

IF THE ENGINE IS COLD:

DO NOT start the engine. Ensure that the vehicle is standing on level ground and proceed as above.

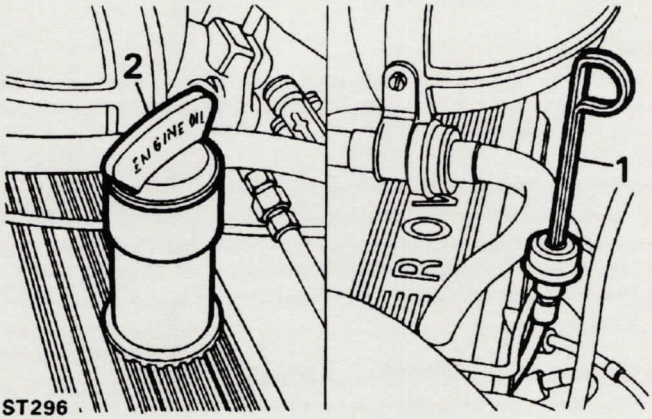
If it is necessary to re-check oil, or if the engine has been started without being thoroughly warmed up, wait at least 30 minutes to confirm oil level.

CAUTION: Oil level must never be above the 'H' notch as engine damage may be caused.



ENGINE OIL LEVEL - Tdi ENGINES - Fig. ST221
Check daily or weekly depending on operating conditions and at least every 500 km (250 miles). The oil level should not be allowed to fall below the **'L'** notch on the dipstick (1) located on the left-hand side of the engine. Whenever possible, the oil level should be checked with the engine hot, as follows:
Stand the vehicle on level ground and wait for at least five minutes, after the engine has stopped, for the oil to drain back into the engine sump.
Withdraw the dipstick (1) at the left-hand side of the engine, wipe it clean, re-insert it to its full depth and remove a second time to take a reading.
If oil level is between 'N' and 'H' (middle and upper notch) add no oil.
If oil level is between 'L' and 'N' (lower and middle) notch add one litre only of the correct grade oil through the twist off filler cap (2) on the rocker cover. If the oil level is below the **'L'** notch, add one litre of oil and re-check the level after five minutes. Add further oil as necessary to raise the level between 'N' and 'H' **DO NOT OVERFILL.** See Data Section 5 for recommended engine oils.

IF THE ENGINE IS COLD:
DO NOT start the engine. Ensure that the vehicle is standing on level ground and proceed as above. If it is necessary to re-check oil, or if the engine has been started without being thoroughly warmed up, wait at least 30 minutes to comfirm oil level.
CAUTION: Oil level must never be above the **MAX** notch as engine damage may be caused.



ENGINE OIL LEVEL - V8 CYLINDER PETROL ENGINES - Fig. ST296

Check daily or weekly, depending on operating conditions and at least every 500 km (250 miles).

Whenever possible, the oil level should be checked with the engine hot, as follows:

Stand the vehicle on level ground and wait at least five minutes, after the engine has stopped, for the oil to drain back into the engine sump.

Withdraw the dipstick (1) at the left-hand side of the engine, wipe it clean, re-insert it to its full depth and remove a second time to take a reading. The oil level should not be allowed to fall below the 'LOW' mark.

Add the correct grade of oil, as necessary, through the screw-on filler cap (2) marked 'ENGINE OIL' on the right-hand front rocker cover. Never fill above the 'HIGH' mark.

See DATA Section 6 for recommended engine oils.

IF THE ENGINE IS COLD:

DO NOT start the engine.

Stand the vehicle on level ground.

Withdraw the dipstick (1) at the left-hand side of the engine, wipe it clean, re-insert it to its full depth and remove a second time to take a reading. The oil level should not be allowed to fall below the 'LOW' mark.

Add the correct grade of oil, as necessary, through the screw-on filler cap (2) marked 'ENGINE OIL' on the right-hand front rocker cover. **Never fill above the 'HIGH' mark.**

ENGINE COOLANT
The coolant level should be checked daily or weekly depending upon the operating conditions.

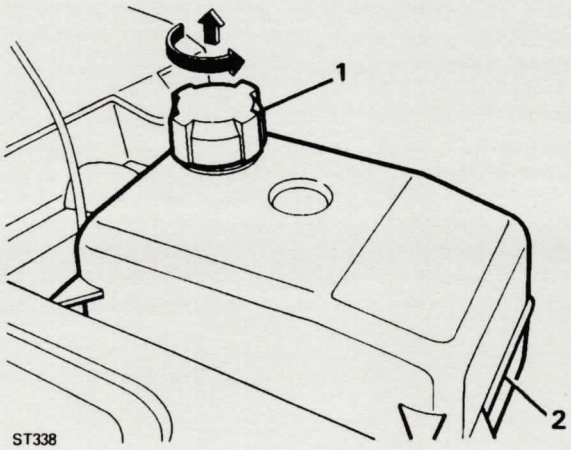
DIESEL MODELS
Never run the engine without coolant, not even for a very brief period, otherwise the injectors may be seriously damaged. This is due to the very high rate of heat transfer in the region of the injector nozzles.

ENGINE PROTECTION - DIESEL AND PETROL MODELS
To prevent frost damage or corrosion of engine parts it is imperative that the cooling system is filled with a solution of clean water and the correct type of anti-freeze, winter and summer. **NEVER** use salt water, not even with anti-freeze otherwise corrosion will occur. In certain countries where the only available water supply may have some salt content, use only clean rainwater or distilled water.

RADIATOR COOLANT LEVEL - Fig. ST338 and ST340
The expansion tank filler cap (1) is in the engine compartment.

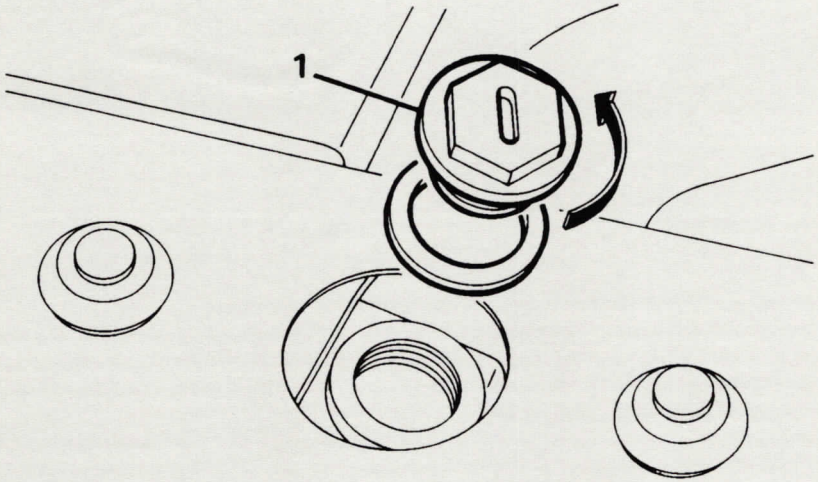
When removing the filler cap (1), first turn it anti-clockwise slowly and allow all pressure to escape, before turning further in same direction to lift it off. When replacing the filler cap it is important that it is tightened down fully. Failure to tighten the filler cap properly may result in water loss, with possible damage to the engine through overheating.

With a cold engine, the fluid in the expansion tank should be approximately level with the rib (2) on the side of the tank. If required, top up with correct mixture of water and anti-freeze. **DO NOT overfill.**



WARNING: Do not remove the filler cap or radiator filler plug when the engine is hot because the cooling system ispressurised and personal scalding could result.

PETROL ENGINE COOLANT

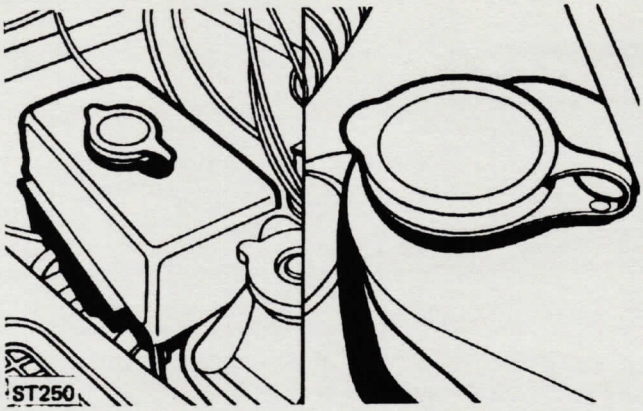


ST340

On V8 models, it is important to remove the filler plug in the top of the radiator as well as in the expansion tank.

With a cold engine, the fluid in the radiator should be approximately 12mm (0.5 inch) below the filler neck. If required, top up with the correct mixture of water and anti-freeze or water. **DO NOT overfill**

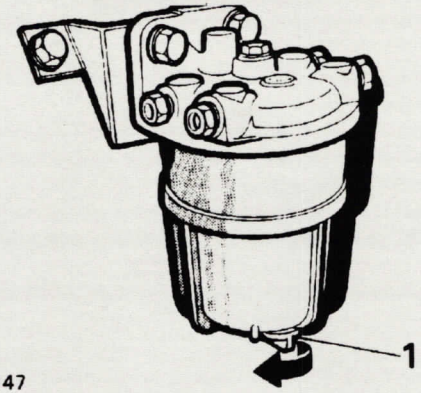
When removing the filler plug (1), first turn it anti-clockwise slowly and allow all pressure to escape, before turning further in the same direction to lift it off. When replacing the filler plug it is important that it is tightened down fully. Failure to tighen the filler plug properly may result in water loss, with possible damage to the engine through overheating.



WINDSCREEN AND REAR DOOR WASHER RESERVOIRS - Fig. ST250

The windscreen washer reservoir (illustrated), is located in the engine compartment. If a rear screen washer is fitted, the reservoir has a large capacity and is fitted with two pumps, one for the front windscreen and one for the rear. If headlamp washers (option) are also fitted, an additional separate reservoir may also fitted.

Open/reservoir cap. Top-up reservoir to within approximately 25 mm (1 in) below bottom of filler neck. Use a screen washer solvent in the container; this will assist in removing mud, flies and road film. In cold weather, to prevent freezing of the water, add a screen washer solvent containing isoproponal, where this is not available it is permissable to use methylated spirits.

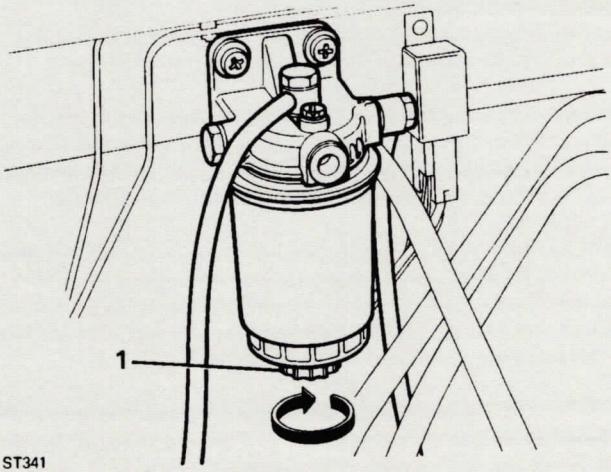


LR2147

DRAIN FUEL SEDIMENTER - DIESEL ENGINES (WHERE FITTED) Fig. LR2147
The sedimenter increases the working life of the fuel filter by removing the larger droplets of water and larger particles of foreign matter from the fuel. The sedimenter is mounted on the chassis side member, near the rear wheel.

DRAIN OFF WATER
Slacken off drain plug (1) to allow water to run out.
When pure diesel fuel is emitted, tighten drain plug.

NOTE: If the vehicle is fitted with an extra fuel tank (option), it may have two sedimenters, one on each side.



ST341

FUEL FILTER, PAPER ELEMENT TYPE (DIESEL MODELS) - Fig. ST341
The filter is mounted at the rear of the engine compartment. Once a month drain off the water as follows:
Slacken off drain plug (1) to allow water to run out.
When pure diesel fuel is emitted, tighten drain plug.

TYRE PRESSURES

Tyre pressures should be checked at least every month for normal road use and at least weekly, preferably daily, if the vehicle is used off the road. See tyre pressure chart at the end of DATA, Section 6.

1. Always check with the tyres cold as the pressure is about 0,2 kgf/cm^2 (3 lbf/in^2) 0,21 bar higher at running temperature.
2. Always replace the valve caps as they form a positive seal on the valves.
3. Any unusual pressure loss in excess of 0,05 to 0,20 kgf/cm^2 (1 to 3 lbf/in^2) 0,07 to 0,21 bar per week should be investigated and corrected.
4. Always check the spare wheel so that it is ready for use at any time.
5. Maximum tyre life and performance will only be obtained if the tyres are maintained at the correct pressure.

Check tyres for tread depth and visually for external cuts in the fabric, exposure of ply or cord structure

The tread should be measured at every maintenance inspection and when the tread has worn to a remaining depth of 1,6 mm (1/16 in), new tyres should be fitted. Do not continue to use tyres that have worn to the recommended limit or the safety of the vehicle could be affected and legal regulations governing tread depth may be broken. At the same time remove embedded flints etc. from the tyre threads with the aid of a penknife or similar tool and check that the tyres have no breaks in the fabric or cuts to sidewalls etc. Clean off any oil or grease on the tyres using white spirit sparingly. Check that there are no lumps or bulges in the tyres or exposure of the ply or cord structure. 'Butyl' synthetic innertubes are fitted and all repairs must be vulcanised.

It is illegal in the UK and many other countries to continue to use tyres with excessively worn tread. Tyre wear should be checked at every maintenance inspection.

BEFORE JACKING THE VEHICLE

It is most important that the jacking procedure, described in this manual, is followed. Wheels should be chocked in all circumstances.

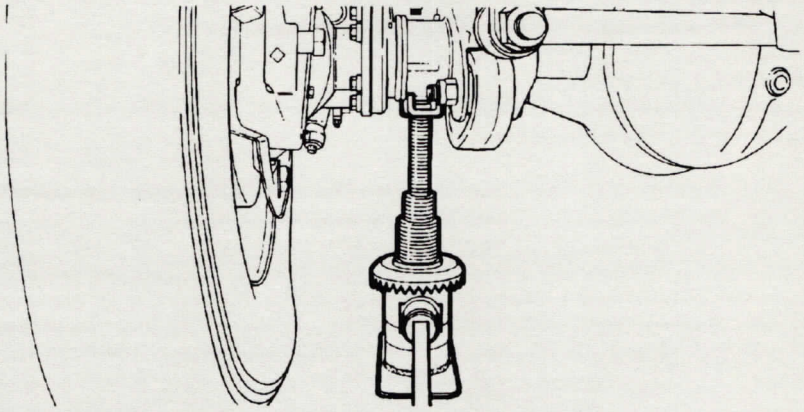
WARNING: The handbrake acts on the transmission, not the rear wheels and may not hold the vehicle when jacking unless the following procedure is used. If one front wheel and one rear wheel are raised no vehicle holding or braking effect is possible. Wheels should be chocked in all circumstances.

The jack should be used on level and firm ground. Always engage the differential lock before jacking. The differential lock is only engaged if the warning light is illuminated with the ignition/starter switch switched on. No person should remain in a vehicle being jacked. Apply the handbrake. Engage first gear in the main gearbox. Engage low gear in the transfer box. Turn off the ignition/starter switch and remove the key.

WARNING: If the vehicle is coupled to a trailer, disconnect the trailer from the vehicle before commencing jacking. This is to prevent the trailer pulling the vehicle off the jack and causing personal injury.

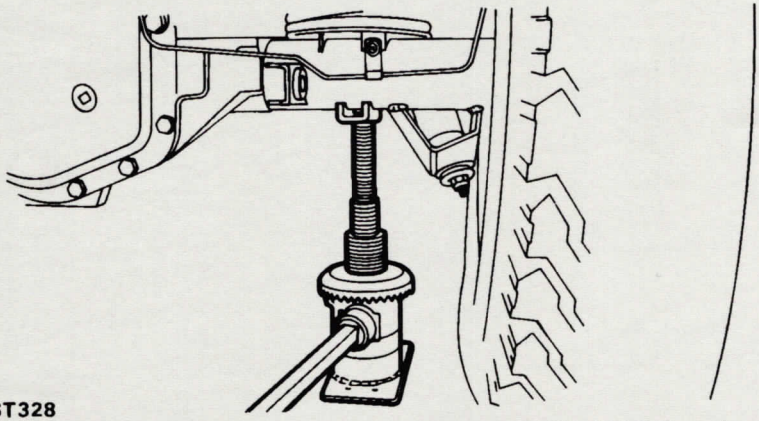
LIFTING JACK TYPES

Two different types of lifting jack are described in the following instructions. Refer to the instructions applicable to the jack being used.



ST297

BOTTLE JACK - Fig. ST297 - SUITABLE FOR ALL MODELS
To jack up a front wheel: See 'BEFORE JACKING THE VEHICLE' on previous page then, Jack up the corner of the vehicle by positioning the jack so that when raised, it will engage with the front axle casing immediately below the coil spring where it will be located between the flange at the end of the axle casing and a large bracket to which front suspension members are mounted.



ST328

To jack up a rear wheel - Fig. ST328: See 'BEFORE JACKING THE VEHICLE' on the previous page then, Jack up the corner of the vehicle by positioning the jack so that when raised, it will engage with the rear axle casing immediately below the coil spring and as close to the shock absorber mounting bracket as possible.

WARNING: It is unsafe to work under the vehicle using only the jack to support it. Always use heavy duty stands or other suitable supports to provide adequate safety. Neglect of the jack may lead to difficulty in a roadside emergency.
Examine the jack occasionally, clean and grease the thread to prevent the formation of rust. When the jack is not in use, it should be retained in its stowage position with the clips provided.
Care must be taken to avoid accidential contact with any underbody parts, but especially the hot exhaust system components, likely to cause personnel injury during raising or lowering the vehicle.

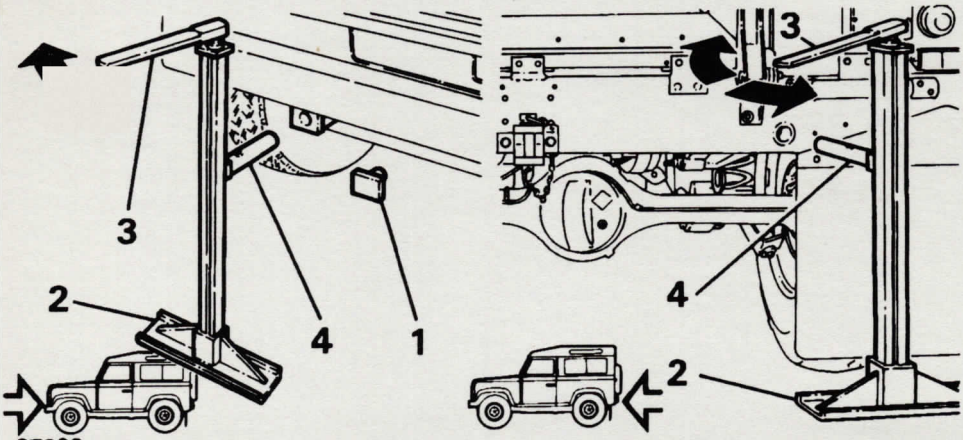
PILLAR JACK - Fig. ST329
- suitable for all models except High Capacity Pick-up rear end

TO JACK UP ANY WHEEL:
Remove the rubber plug (1) from the jacking tube in the chassis at the corner to be raised. Locate the jack pillar (2) into the base.

WARNING: DO NOT use the jack without the base fitted, as it would not support the vehicle properly and could cause personal injury.

Fit the handle (3) to the jack and adjust the height of the jacking peg until it can be lifted into the jacking tube. Note that the jack handle has a ratchet, use one side to raise the jack, turn the handle over to lower the jack. Ensure that the jack peg (4) is pushed into the jacking tube as far as the stop and that the pillar is upright, then operate the jack handle to raise the vehicle.

WHEEL CHANGING
See 'BEFORE JACKING THE VEHICLE' earlier page then, using the wheel nut wrench supplied in the tool kit, initially slacken the nuts on the wheel to be removed before jacking the vehicle. Jack up the corner of the vehicle. When the wheel is clear of the ground, remove wheel nuts and lift off wheel. If available, place a drop of oil or grease on the wheel studs to assist in replacement. Fit spare wheel; tighten the nuts as much as possible.

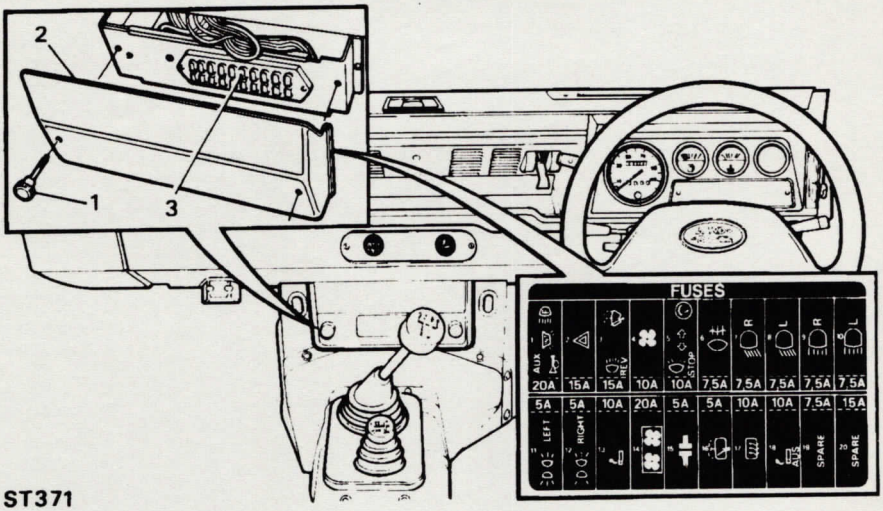


ST329

Lower the vehicle to the ground and finally tighten the nuts to the following torque: 10,4 to 11,7 kgf m (75 to 85 lbf ft). Remember to disengage the differential lock after road wheel has been replaced.

WARNING: Always secure tools, jack and spare wheel in their proper storage positions after wheel changing.

ROAD WHEEL NUTS
Check road wheel nuts for tightness, torque 10,4 to 11,7 kgf m (75 to 85 lbf ft). DO NOT overtighten. When using the wheelbrace from the vehicle tool kit apply hand pressure only. DO NOT use foot pressure or extension tubes as this could overstress the wheel studs.



ST371

FUSE BOX - Fig. ST371

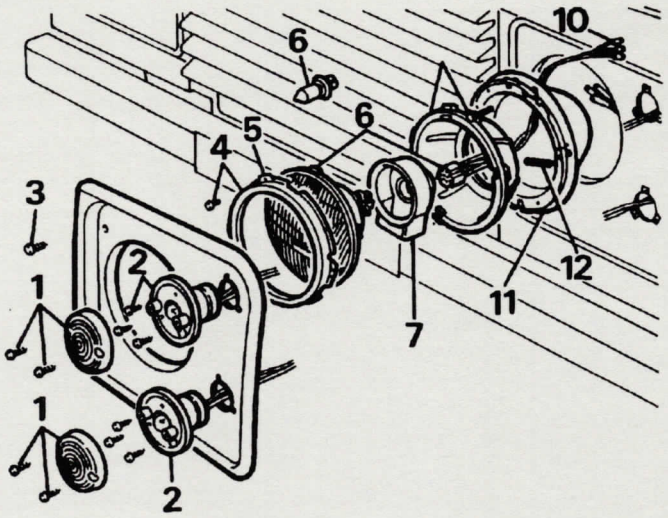
The fuse box is located in the centre of the dash in front of the main gear change lever. The fuses are colour coded with their amp rating, as follows;

TAN	5 A
BROWN	7.5 A
RED	10 A
BLUE	15 A
YELLOW	20 A
GREEN	30 A (AIR CONDITIONED MODELS ONLY)

A label in the fuse box cover shows the circuits protected, the fuse colours and their fitted position.

TO REPLACE A FUSE

Unscrew the two knobs (1).
Pull off the fuse box cover(2).
Replace fuse (3) as required.
A fuse extractor on the inside of the cover allows easy removal and replacement of any fuse.
Refit the fuse box cover.

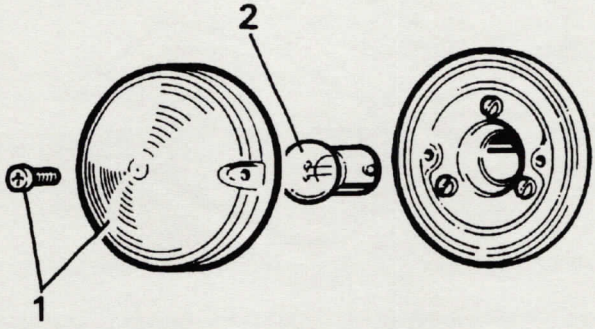


ST301

HEADLAMPS - Fig. ST301
To replace light unit or bulb:

CAUTION: DO NOT touch the glass on "Halogen" bulbs with the fingers, as this could damage the bulb. If contact is accidently made, wipe the glass gently with methylated spirits.
Remove the screw and lens (1) from the side and flasher lamps.
Remove the screws and pull the lamp back plates (2) forward, as far as the leads allow.
Remove the screws retaining the plastic finisher (3) for the headlamp and move the finisher aside.
Remove the three recessed head screws (4) retaining the headlamp rim.
Remove the rim (5).
Lift out light unit (6) and pull off electrical connector.
Remove from connector the rubber grommet (7).
Bulb or light unit as applicable can now be replaced.
Refit rim and headlamp finisher.

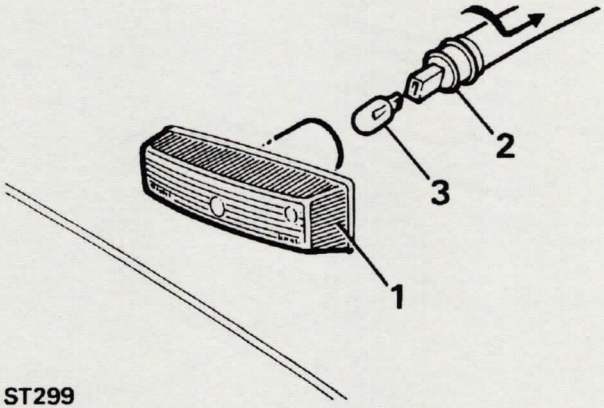
CAUTION: Fitting headlamp bulbs or light units with a higher watt value than the Specification in the Data Section, will result in damage to the 'Dim Dip' unit (if fitted), wiring and switches.



LR2067

SIDE, TAIL, STOP AND FLASHER LAMP - Fig. LR2067

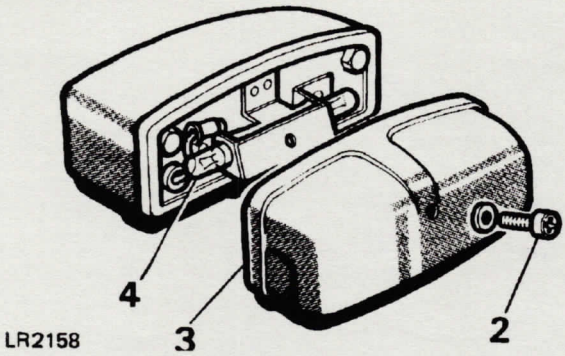
To replace a bulb:
Remove the retaining screws (1) and withdraw the lens.
Renew the bulb (2).
Replace the lens and retaining screws.



ST299

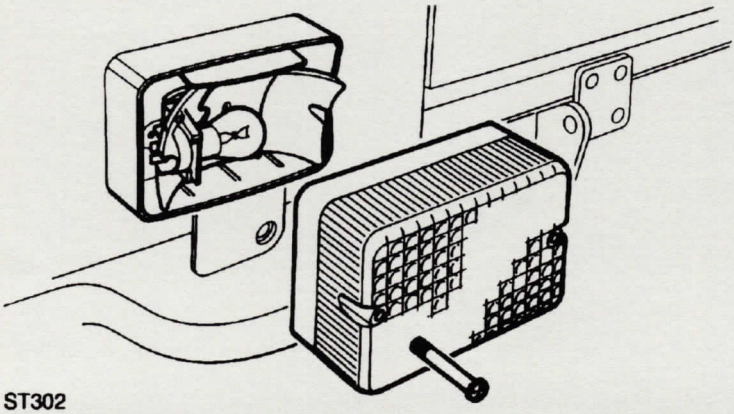
DIRECTION INDICATOR SIDE REPEATER LAMPS, ON FRONT WINGS (WHEN FITTED) - Fig. ST299

Pull the complete lamp (1) from the wing. Twist the bulb header (2) anti-clockwise to release it from the lamp and pull the bulb (3) from the holder. Fit a new bulb and reassemble the lamp.

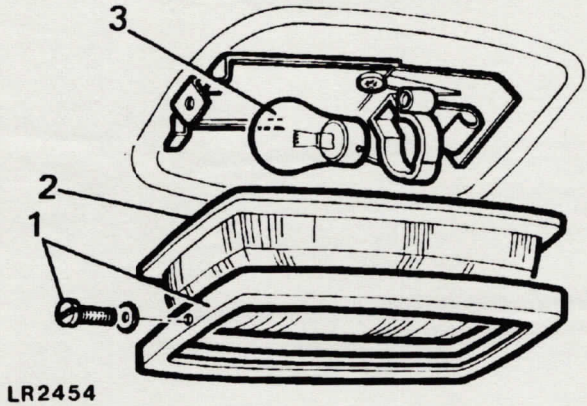


LR2158

REAR NUMBER PLATE LAMP (WHERE APPLICABLE) - Fig. LR2158
To replace the bulbs:
Slacken the securing screw (2).
Remove cover (3).
Bulbs (4) are then accessible in the lamp body.
Replace bulbs and refit cover.


ST302

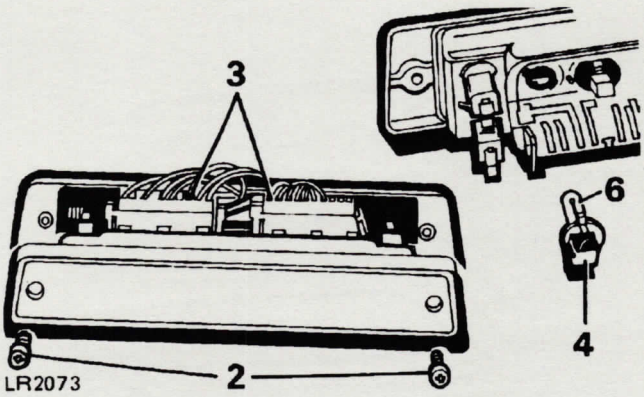
REVERSING AND REAR FOG GUARD LAMP - Fig. ST302
To replace the bulb:
Remove the retaining screws (1) and withdraw the lens.
Renew the bulb (2).
Replace the lens and retaining screws.



LR2454

INTERIOR LIGHT (WHERE APPLICABLE) - Fig. LR2454

To replace the bulb:
Remove screw (1) retaining rim and cover.
Remove the rim.
Remove retaining cover (2).
Replace bulb (3).
Refit cover and trim.



WARNING LIGHTS - Fig. LR2073

To replace a bulb:

Disconnect the battery.

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

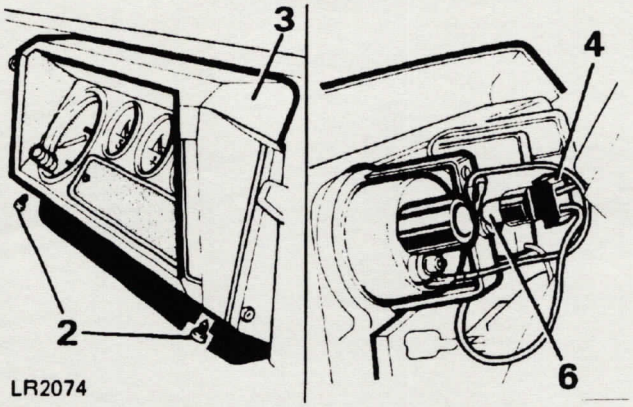
Pull off plug connector (3) to give access to warning light bulbs.

Twist the bulb holder (4) and pull it from its socket.

Pull the bulb (6) from the holder.

Fit a new bulb and refit holder and plug connector.

Refit module and reconnect battery.



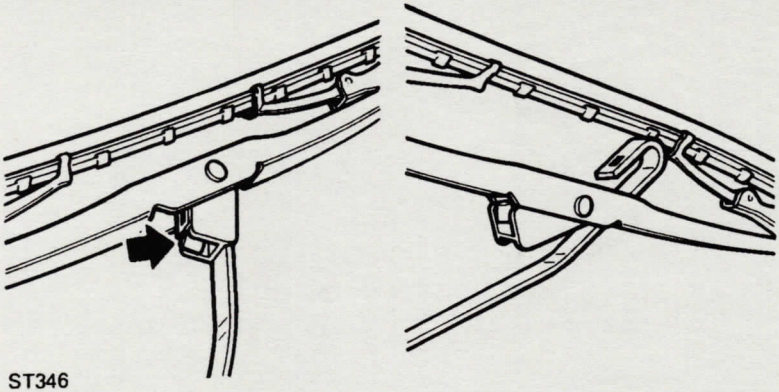
LR2074

INSTRUMENT ILLUMINATION - Fig. LR2074

To replace a bulb:
Disconnect the battery.
Remove four screws (2) retaining the instrument panel.
The instrument panel (3) can now be eased forward for access to the bulbs. If necessary, disconnect the drive cable from the back of the speedometer.
Twist the bulb holder (4) and pull it from its socket.
Pull the bulb (6) from the holder.
Fit new bulb and refit holder.
Replace instrument panel.
Reconnect the battery.

WINDSCREEN AND REAR DOOR WIPER BLADES - Fig ST346

Check, and if necessary, renew wiper blades.



ST346

Lift the wiper arm away from the windscreen.

Squeeze the spring clip and push the wiper blade towards the windscreen and unhook it from the wiper arm.

To fit a new blade, push it over the arm and hook the arm into the swivel bracket ensuring that the retaining clip is engaged.

CLEANING THE VEHICLE
Use a sponge and plenty of water to clean the exterior.

STEAM CLEANING
To prevent consequential rusting, any steam cleaning within the engine bay must be followed by careful re-waxing of the metallic components affected. Particular attention should be given to the steering column, engine water pipes, hose clips and the ignition coil clamp.

CAUTION: DO NOT use water to clean the dash panel, as it could enter the fuse box and switches causing damage.

WINTER CONDITIONS WHERE SALT IS USED ON ROADS.
Wash the vehicle regularly during the winter, and thoroughly at the end, to remove all traces of salt from the exterior and underneath. Also, clean off any salt deposits from the engine compartment.

HEATED REAR SCREEN, AS APPLICABLE
The following precautions must be taken to avoid irreparable damage being caused to the printed circuit which is 'fired' on to the interior of the screen.

(a) Do not remove labels or stickers from the screen with the aid of sharp instruments or similar equipment which are likely to scratch the glass.
(b) Care should be taken to avoid inadvertently scratching the glass with a ringed finger etc. when cleaning or wiping the screen.
(c) Do not clean the screen with harsh abrasives.

WORKSHOP MAINTENANCE 5

WORKSHOP MAINTENANCE SCHEDULES

The following maintenance should be carried out by trained personnel in a fully equipped workshop. If the vehicle is operating in a remote area where workshop facilities are not available, maintenance and repair work should be carried out by experienced mechanics in safe conditions. Maintenance should normally be carried out at 10,000 km (6000 mile) intervals or six months, whichever is first, as described in the following schedules. In severe conditions, such as deep mud or sand, or a very dusty atmosphere, the intervals should be reduced to monthly, weekly or even daily for some items. Ask your Land Rover Dealer for advice.

WARNING: DO NOT use any lubricants solvents or sealants etc, before reading any warnings and instructions supplied with these substances, as they could be harmful if improperly used.

WARNING: Two wheel roller tests must be restricted to 5 km/hour (3 miles/hour). DO NOT engage the differential lock or the vehicle will drive off the roller test rig because the Land Rover is in permanent wheel drive.

WARNING: Use care when draining oil from the engine, gearbox and axles, if it is hot it could cause personal scalding.

WARNING: DO NOT work underneath the vehicle unless it is safely parked and the wheels chocked, or it is supported by heavy duty stands, otherwise the vehicle could move causing personal injury.

MAINTENANCE INTERVALS

- kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
- miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
VEHICLE INTERIOR															
1 Check condition and security of seats, seat belt mountings, seat belts, buckles and operation of inertia seat belts.		•		•		•		•		•		•		•	
2 Check operation of foot brake and clutch with engine running; stop engine		•		•		•		•		•		•		•	
3 Check operation of all lamps, horns, warning indicators		•		•		•		•		•		•		•	
4 Check operation of front/rear screen wipers and washers and condition of wiper blades		•		•		•		•		•		•		•	
5 Check security and operation of hand brake; release fully after checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
6 Remove battery connections: clean and grease - refit		•		•		•		•		•		•		•	
7 Renew brake servo filter						•						•			
VEHICLE EXTERIOR															
8 Check/adjust headlamp and auxiliary lamp alignment *		•		•		•		•		•		•		•	
9 Check front wheel alignment		•		•		•		•		•		•		•	
10 Remove road wheels	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
11 Check tyres for: compliance with manufacturers specification; visually for cuts, lumps, bulges, uneven tread wear and depth; tyre pressures (including spare) adjust if required -	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
12 Inspect brake pads for wear, calipers for leaks and discs for condition	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
13 Remove road wheel brake drums, wash out dust, inspect shoes for wear and drums for condition	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

* Where applicable

· kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
· miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
14 Inspect wheel cylinders for fluid leaks	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
15 Refit road wheel brake drums	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16 Adjust road wheels brakes	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17 Refit road wheels to original hub position	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
18 Check operation of all doors, bonnet and tailgate locks		•		•		•		•		•		•		•	
19 Lubricate all hinges and door-check mechanisms	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
UNDER BONNET 20 Check cooling and heater systems for leaks, hoses for security and condition		•		•		•		•		•		•		•	
21 Check brake servo hose for security and condition		•		•		•		•		•		•		•	
22 Check condition of heater plug wiring for fraying, chafing and deterioration (diesel only)		•		•		•		•		•		•		•	
23 Check ignition wiring and H.T.leads for fraying, chafing and deterioration		•		•		•		•		•		•		•	
24 Clean distributor cap, check for cracks and tracking.		•		•		•		•		•		•		•	
25 Lubricate distributor motor spindle with rotor arm removed				•				•				•			
26 Clean/adjust distributor points (not V8)		•		•		•		•		•		•		•	
27 Renew distributor points (not V8)				•				•				•			
28 Clean/adjust spark plugs	•		•		•		•		•		•		•		•
29 Renew spark plugs		•		•		•		•		•		•		•	
30 Check/adjust valve clearances at first 6,000 ml, 12,000 ml & thereafter at every 12,000 ml (Tdi only)	•	•		•		•		•		•		•		•	

· kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
· miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
(Under bonnet continued)															
31 Check/adjust valve clearances (all models except Tdi & V8)		•		•		•		•		•		•		•	
32 Diesel injectors: check for correct spray pattern, ensure no leakage is evident				•				•				•			
33 Renew fuel filter element (diesel)		•		•		•		•		•		•		•	
34 Check crankcase breathing system for leaks, hoses for security and condition	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
35 Renew air cleaner element(s)		•		•		•		•		•		•		•	
36 Check air cleaner dump valve, clean or renew		•		•		•		•		•		•		•	
37 Renew engine breather filter (V8)				•				•				•			
38 Clean engine breather filter (all models except V8)		•		•		•		•		•		•		•	
39 Renew engine flame traps(s) (V8)		•		•		•		•		•		•		•	
40 Check condition of driving belts - adjust if required	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
41 Check throttle operation		•		•		•		•		•		•		•	
42 Top-up carburetter piston dampers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
43 Check/top-up cooling system	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
44 Check/top-up fluid in power steering reservoir	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
45 Check/top-up steering box (manual steering)		•		•		•		•		•		•		•	
46 Check/top-up clutch fluid reservoir	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
47 Check/top-up brake fluid reservoir	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
48 Check/top-up windscreen and rear washer reservoir	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
49 Lubricate accelerator control linkages and pedal pivot		•		•		•		•		•		•		•	

* Where applicable

- kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
- miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
(Under bonnet continued) 50 Check dwell angle - adjust as necessary (not V8)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
51 Check voltage drop between coil CB and earth		•		•		•		•		•		•		•	
52 Check/adjust ignition timing **Note:** It is important that the ignition timing dwell angle and carburetter adjustments are set in accordance with the vehicle engine specification and fuel octane rating. Refer to the relevant workshop manual for details	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
53 Check operation of air intake temperature control system (V8)		•		•		•		•		•		•		•	
54 Check/adjust engine idle speed and carburetter mixture settings with engine at normal running temperature	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
55 Check/adjust steering box		•		•		•		•		•		•		•	
UNDER VEHICLE 56 Clean diesel intercooler element (Tdi engines only)									•						
57 Renew engine oil and filter	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
58 Renew gearbox oil - 4 cylinder models				•				•				•			
59 Renew gearbox oil - V8 models		•		•		•		•		•		•		•	
60 Check/top up gearbox oil - 4 cylinder models	•	•	•		•	•	•		•	•	•		•	•	•
61 Check/top up gearbox oil - V8 models	•		•		•		•		•		•		•		•
62 Renew transfer box oil				•				•				•			
63 Check/top up transfer box oil	•	•	•		•	•	•		•	•	•		•	•	•
64 Renew front axle oil				•				•				•			
65 Check/top up front axle oil	•	•	•		•	•	•		•	•	•		•	•	•
66 Renew swivel pin housing oil				•				•				•			
67 Check/top up swivel pin housing oil	•	•	•		•	•	•		•	•	•		•	•	•

* Where applicable

- kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
- miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
(Under vehicle continued) 68 Renew rear axle oil				•				•				•			
69 Check/top up rear axle oil	•	•	•		•	•	•		•	•	•		•	•	•
70 Lubricate propeller shaft sliding joints				•				•				•			
71 Lubricate propeller shaft universal joints		•		•		•		•		•		•		•	
72 Lubricate handbrake mechanical linkage	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
73 Check visually brake, fuel, clutch pipes/unions for chafing, leaks and corrosion		•		•		•		•		•		•		•	
74 Check exhaust system for leakage, security and damage		•		•		•		•		•		•		•	
75 Check for fluid leaks from power, manual steering and suspension systems, hydraulic pipes and unions for chafing and corrosion	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
76 Check/tighten steering unit and steering rod ball joint fixings, check condition of ball joint and dust covers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
77 Check tightness of propeller shaft coupling fixings		•		•		•		•		•		•		•	
78 Ensure front and rear axle breathers are free from obstruction		•		•		•		•		•		•		•	
79 Check/tighten front and rear axle suspension link fixings, check conditions of mounting rubbers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
80 Check for oil leaks from engine and transmission		•		•		•		•		•		•		•	
81 Clean fuel sedimenter (diesel only)		•		•		•		•		•		•		•	
82 Renew fuel filter element (petrol)		•		•		•		•		•		•		•	
83 Drain flywheel housing if drain plug is fitted for wading (refit)		•		•		•		•		•		•		•	

* Where applicable

- kilometers x 1000	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
- miles x 1000 or months	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
(Under Vehicle continued) 84 Clean camshaft drive belt housing filter (diesel)		•		•		•		•		•		•		•	
85 Adjust handbrake if required	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
86 Carry out road or roller test	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
87 Check turbo charger boost pressure (2.5 litre diesel only)				•				•				•			

Camshaft drive belt - 2 1/2 litre diesel engines
The engine timing gears are driven by a flexible rubber belt which must be renewed at intervals determined by the severity of operating conditions.
In reasonable, temperate climate operation, renew the belt every 100,000 km (60,000 miles) or every five years whichever occurs earlier.
In adverse operating conditions such as work in dusty atmospheres, high ambient temperatures and desert and tropical zones, renew the belt every 50,000 km (30,000 miles) or every two and a half years \ whichever occurs earlier.
CAUTION: If the drive belt is not renewed at the correct interval, it could fail, resulting in serious engine damage.

It is recommended that:
At 18,000 mile (30,000 km) intervals or every 18 months, whichever is the sooner, the hydraulic brake fluid should be completely renewed.
At 36,000 mile (60,000 km) intervals or every 3 years, whichever is the sooner, all hydraulic brake fluid, seals and flexible hoses should be renewed.
All working surfaces of the master cylinder, wheel cylinders and caliper cylinders should be examined and renewed where necessary.
At 36,000 mile (60,000 km) intervals remove all suspension dampers, test for correct operation, refit or renew as necessary.
At two yearly intervals or at the onset of the second winter, the cooling system should be drained, flushed and refilled with the required water and anti- freeze solution. The battery electrolyte level should be checked and topped up, if required, every three years in temperate climates and once a year in high ambient temperatures. Air cleaner. When the vehicle is used in dusty or field conditions or deep wading, frequent attention to the air cleaner may be required.

DIESEL ENGINES:
If the vehicle is operated on fuel with a high sulphur content (over 1%) the engine oil change intervals must not exceed 5000 km (3000 miles)

SPECIAL OPERATING CONDITIONS

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

ADDITIONAL DAILY OR WEEKLY ATTENTION DEPENDING ON OPERATING CONDITIONS:

Check/top-up transfer box oil.
Check steering rubber boots for security and condition. Renew if damaged.
Check brake fluid level: consult your dealer if any fluid loss is suspected.
Clean brake discs and calipers.
Lubricate front and rear propeller shaft grease points and front sliding joint. Under tropical or severe conditions, particularly where sand is encountered, the sliding joints must be lubricated very frequently to prevent ingress of abrasive material.
Every week and every maintenance inspection check tyre pressures and inspect tyre treads and side walls. Under arduous cross-country conditions the tyre pressures should be checked much more frequently, even to the extent of a daily check.

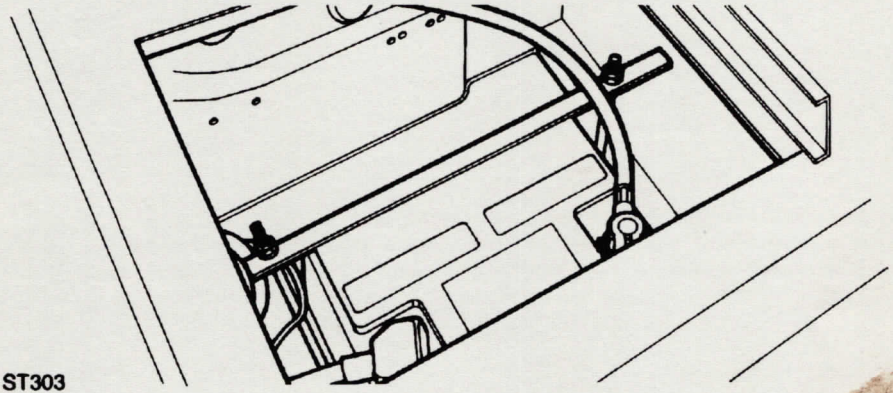
MONTHLY

Renew gearbox oil.
Renew transfer box oil.
Check air cleaner element and renew every 6 months or as necessary.

DOING THE WORKSHOP MAINTENANCE

The 'Maintenance Schedules' and the methods described on the following pages are in the same order. Work through the schedules progressively, refering to the methods as necessary. Where a method has not been included, it is either, a simple check covered by the description in the schedule, has already been covered in Section 4, or needs reference to the appropriate Workshop Manual.

WARNING: Do not let the engine run without battery connected.
Do not use a high-speed battery charger as a starting aid.
When using a high-speed charger to charge the battery, the battery must be disconnected from the rest of the vehicle's electrical system.
When installing, ensure that the battery is connected with the correct polarity.
No larger battery than 12v must be used.
DO NOT use steam to clean the engine compartment.
The battery MUST be disconnected before carrying out any electrical welding on the vehicle.
IF A REPLACEMENT BATTERY IS FITTED TO THE VEHICLE, IT SHOULD BE THE SAME TYPE AS THE ORIGINAL BATTERY. OTHER BATTERIES MAY VARY IN SIZE AND TERMINAL POSITIONS; AND THIS COULD BE A POSSIBLE FIRE HAZARD IF THE TERMINALS OR LEADS COME INTO CONTACT WITH THE BATTERY CLAMP ASSEMBLY. WHEN FITTING A NEW BATTERY ENSURE THAT THE TERMINALS AND LEADS ARE WELL CLEAR OF THE BATTERY CLAMP ASSEMBLY.



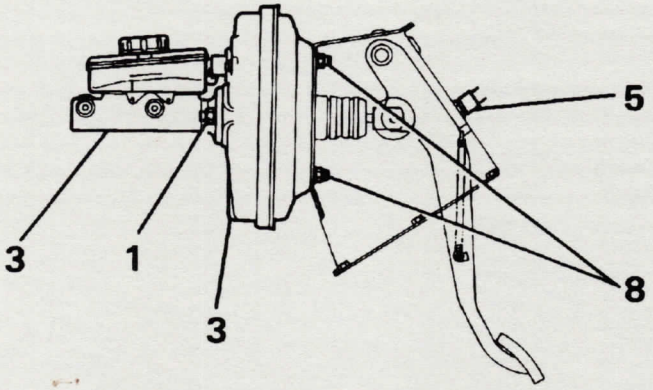
ST303

BATTERY ELECTROLYTE

A low maintenance battery is installed in the vehicle underneath the left-hand front seat. The battery compartment (Fig. ST303) is accessible by pulling up the front of theseat to release it from retaining clips and drawing it forward. This will reveal the compartment cover which can be removed after release of a catch on the front edge. Dependent upon climate conditions the electrolyte levels should be checked as follows:
Temperature climates every 3 years. Hot climates every year. The exterior of the battery should be occasionally wiped clean to remove any dirt or grease. Periodically remove the battery terminals to clean and coat with petroleum jelly. To check if maintenance is required, gently prise off the vent covers and inspect the electrolyte level of the centre cell. This should be no lower than 1 mm (0.04 in) above the top of the plates. If necessary, top up (with distilled water only) to a maximum of 3 mm (0.12 in) above the plates.

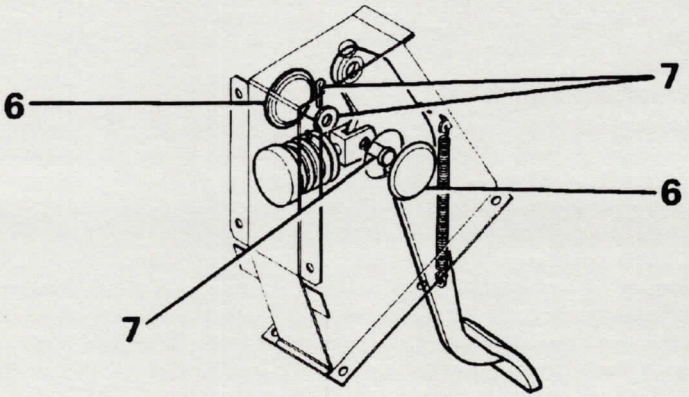
RENEW BRAKE SERVO FILTER - Figs. ST304, ST305 and ST1485

Remove the nuts (1) securing the master cylinder to the servo.
Release the clip retaining the brake pipe to the clutch pipe.
Separate the master cylinder (3) from the servo.
Disconnect the vacuum hose from the servo.
Disconnect the leads (5) from the stop lamp switch at the rear of the pedal box.

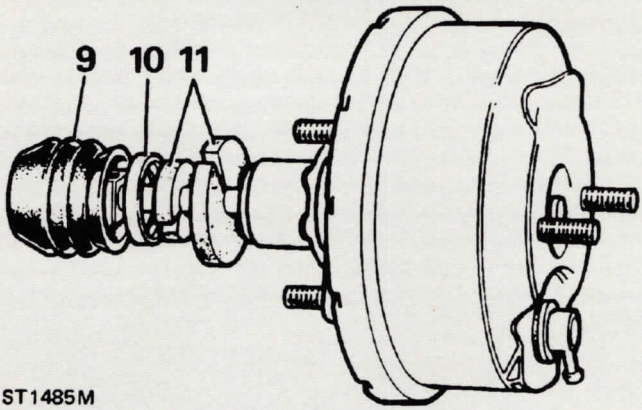


ST304

Remove the blanking grommets (6) from the pedal box.
Remove the split pin (7) from the clevis and withdraw the clevis pin and washer.
Remove the four nuts (8) securing the servo to the pedal box and remove the servo.



ST305

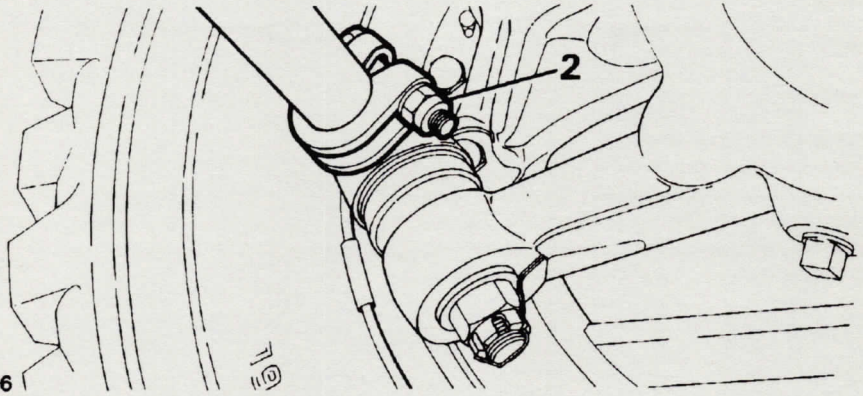


ST1485M

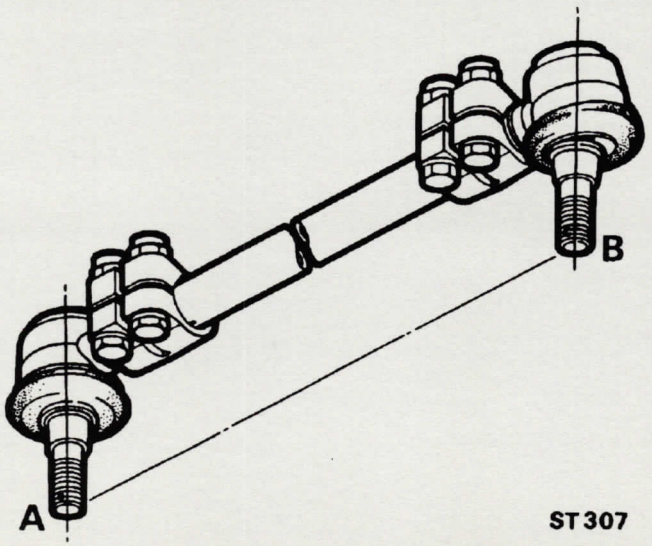
Pull back the dust cover (9).
Release the end-cap (10).
Cut the filters (11) to remove them from the shaft. Clean the filter seating and fit the new filters noting that they must be cut to fit over the shaft. Fit the end-cap and dust cover and refit the servo and master cylinder to the vehicle reversing the removal procedure. Use a new split pin to secure the clevis. Test the brakes.

CHECK FRONT WHEEL ALIGNMENT Fig. ST306 AND ST307

Use recognised wheel alignment equipment to perform this check and adjustment. The correct setting is: Front wheel toe out: 1,19 to 2,38 mm (3/64 to 3/32 in). Check and adjust with the vehicle on level ground. Set the road wheels to the straight ahead position and push the vehicle forward a short distance. Slacken the clamp bolts (2) securing the ball joints at both ends of the track rod. Twist the track-rod to decrease or increase its effective length as required to achieve the correct alignment. Push the vehicle rearwards whilst moving the steering wheel from side to side to settle the ball joints. Then with the wheels in the straight ahead position push the vehicle forward a short distance and recheck the alignment. If necessary make further adjustments. When the alignment is correct tighten the ball joint clamp bolts. When adjusting the track rod it is important to ensure that the ball joints are in the same angular plane and that the ball joint pins are central in their respective housings, as example 'A' illustrated below. Premature wear could result if the pins are inclined to one-side as illustration B.



ST306



ST307

This symbol may be found on your vehicle or equipment and it means **'CAUTION** - do not touch or attempt adjustments until you have read the special instructions concerned on the relevant pages of the Driver's Handbook.'

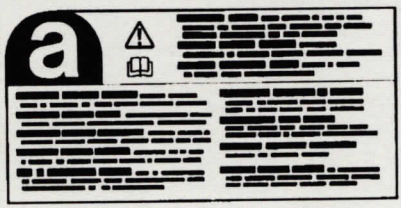
WARNING: Some components on your vehicle, such as gaskets and friction surfaces (brake linings or clutch discs), may contain asbestos. Inhaling asbestos dust is dangerous to your health. You are therefore advised to have any maintenance or repair operations on such components carried out by a recognised Land Rover/Range Rover dealer or distributor. If, however, service operations are to be undertaken on parts containing asbestos, the following essential precautions must be observed:

Work out of doors or in a well ventilated area and wear an approved protective breathing mask.

Dust found on the vehicle or produced during work on the vehicle should be removed by extraction and not by blowing.

Dust waste should be dampened, placed in a sealed container and marked to ensure safe disposal.

If any cutting, drilling etc, is attempted on materials containing asbestos the item should be dampened and only hand tools or low speed power tools used.

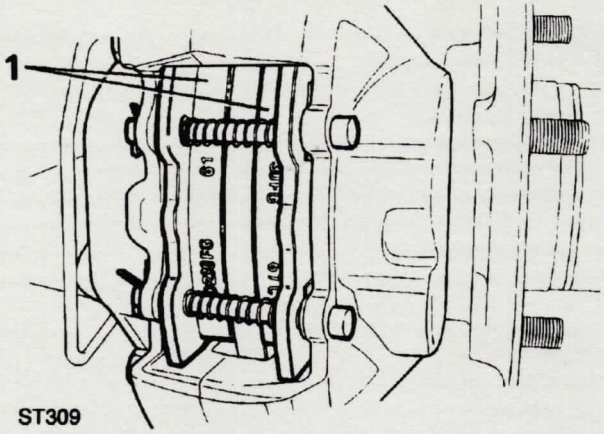


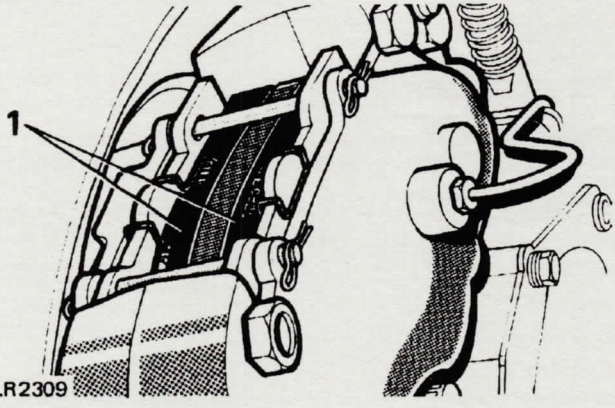
For your further guidance, Land Rover replacement parts which contain asbestos are progressively being identified by the symbol on the left. If you are in any doubt, please consult your dealer or distributor.

The following instructions should be read in conjunction with the brake maintenance recommendations in this Handbook.

BRAKE PAD REPLACEMENT

Your brake pads will require replacement when there is less than 3 mm (0.125 in) of brake lining material remaining. The brake pads fitted to variants with an auxiliary warning system have a built-in electrical sensor to activate the instrument cluster warning light when the pads are worn. If your vehicle has this feature, when purchasing replacement disc pad kits, it is important to ensure that they have sensors and that they have the same friction characteristics.





CHECK/ADJUST ROAD WHEEL BRAKES

FRONT BRAKE PADS - Figs. ST309 and LR2309

The upper illustration shows the front brake for the Land Rover Ninety; and the lower illustration for the Land Rover One Ten.

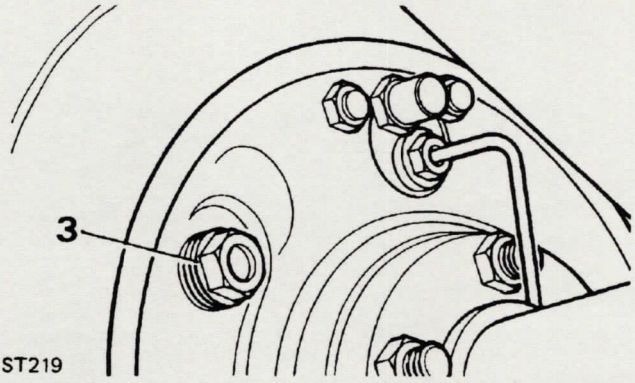
Hydraulic disc brakes are fitted at the front and the correct brake adjustment is automatically maintained; no provision is therefore made for adjustment.

Check the thickness of the front brake pads (1) and renew if the minimum is less than 3,0 mm (0.125 in).

Check that rear of brake pad is even across the friction face.

Check for oil contamination on brake pads and discs, also check condition of brake discs for wear and/or corrosion.

If replacement or rectification is necessary, this should be carried out by your Land Rover Distributor or Dealer.



REAR BRAKE LININGS (NINETY MODELS ONLY) - Fig. ST219

Hydraulic drum brakes are fitted at the rear and require the following attention.

When the vehicle is used in deep muddy conditions the brake drums must be periodically removed and cleaned, at the same time the brake shoes and anchor plate should be thoroughly cleaned.

When used continuously under exceptionally wet and muddy conditions this operation may be advisable once, or even twice a week, to prevent the abrasive action of packed mud rapidly wearing out brake linings and drums.

When lining wear has reached the point where the pedal travel becomes excessive, it is necessary to adjust the brake shoes closer to the drum.

Proceed as follows:

The shoes are set by a single hexagon adjustment bolt operating through a serrated snail cam enabling both shoes to be adjusted to obtain the best results.

Jack up one rear wheel.

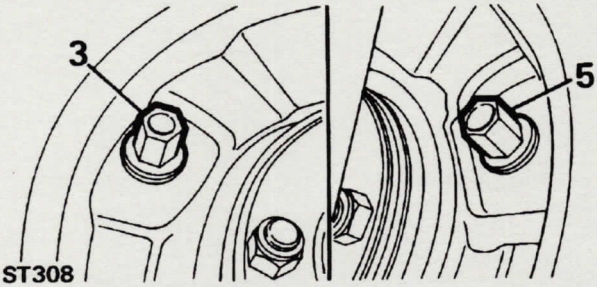
Check that the raised wheel rotates freely then turn the adjuster (3) until the brake shoe is in firm contact with the drum.

Slacken off the adjuster just sufficiently for the drum to rotate freely.

Lowerthe wheel to the ground.

Repeat the procedure for the other wheel.

WARNING: See WARNING'S at the start of the section.



REAR BRAKE LININGS (ONE TEN MODELS ONLY) - Fig. ST308

Hydraulic drum brakes are fitted at the rear and require the following attention.

When the vehicle is used in deep muddy conditions the brake drums must be periodically removed and cleaned, at the same time the brake shoes and anchor plate should be thoroughly cleaned.

When used continuously under exceptionally wet and muddy conditions this operation may be advisable once, or even twice a week, to prevent the abrasive action of packed mud rapidly wearing out brake linings and drums.

When lining wear has reached the point where the pedal travel becomes excessive, it is necessary to adjust the brake shoes closer to the drum.

Proceed as follows:

Each shoe is independently set by means of a hexagon adjustment bolt operating through a serrated snail cam and each shoe should be set individually to obtain the best results.

Jack up one rear wheel.

Check that the raised wheel rotates freely then turn one adjuster (3) until the brakeshoe is in firm contact with the drum.

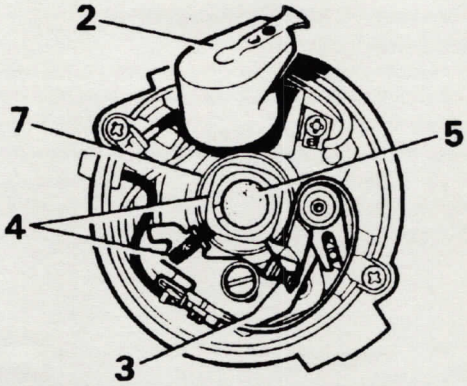
Slacken off the adjuster just sufficiently for the drum to rotate freely.

Repeat for the other brake shoe (5).

Lower the wheel to the ground.

Repeat the procedure for the other wheel.

WARNING: See WARNING'S at the start of the section.

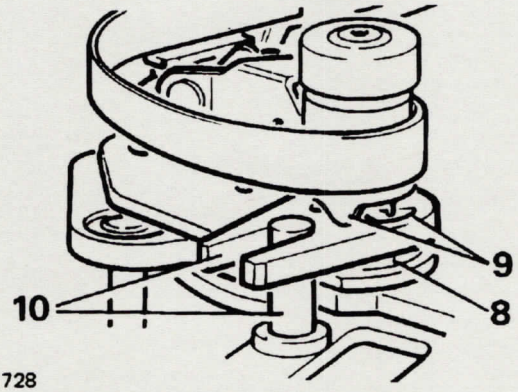


ST1727

DISTRIBUTOR - CLEAN AND LUBRICATE (4-CYLINDER PETROL MODELS) - Fig. ST1727 and ST1728

Cleaning the points. Release the clips and remove the distributor cap. Pull the rotor arm (2) from the cam spindle. Clean the contact points (3) with fine emery cloth or carborundum stone and wipe clean. Renew the points if worn or pitted. Lubrication. Lightly smear the cam (4) with grease. Do not oil the cam wiping pad. Add a few drops of oil to the felt pad (5) in the top of the cam spindle. Apply a few drops of oil through the gap in the base plate to lubricate the advance mechanism.

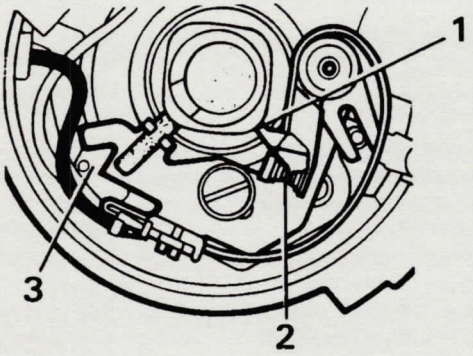
Every 40,000 km (24,000 miles) add a drop of oil to the moving plate bearing groove. Using grease lubricate the underside of the heel actuator (8). Grease the actuator ramps and contact breaker heel ribs (9). Apply grease to the fixed pin and the actuator fork. Align the cam slot and rotor peg and press the rotor arm onto the spindle. Clean the inside of the cap and refit, noting that the cap is located on a peg and can only be fitted one way.



ST1728

DISTRIBUTOR - (4-CYLINDER PETROL MODELS) - Fig. ST348

Check and adjust the contact points clearance as follows:
Remove the distributor cap and rotor arm.
Rotate the crankshaft until the contact heel (2) is on the highest point of a cam.
Adjust the gap (3) by inserting a screwdriver blade between the 'V' shaped notch (4) and pip and twist the screwdriver.
Insert a 0,35 to 0,40 mm (0.014 to 0.016 in) feeler gauge between the points and adjust to a sliding fit and tighten the retaining screw.
Fit the rotor arm and distributor cap.

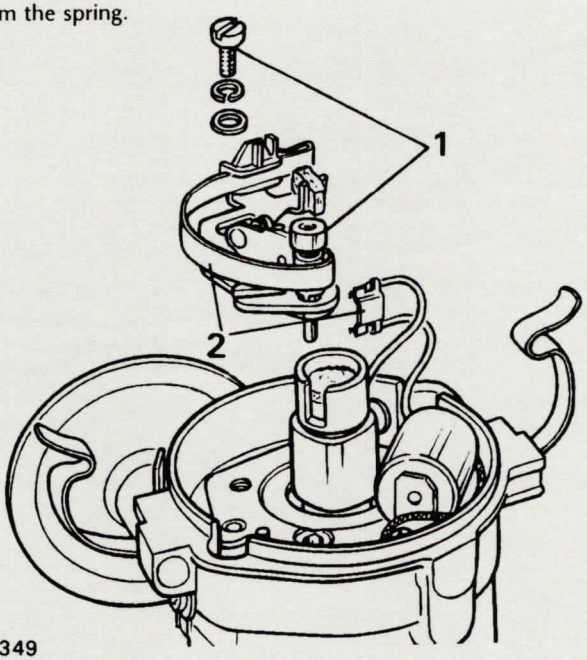


ST348

DISTRIBUTOR (4-CYLINDER PETROL MODELS) RENEWING THE CONTACT BREAKER POINTS

REMOVE THE OLD CONTACTS - ST349

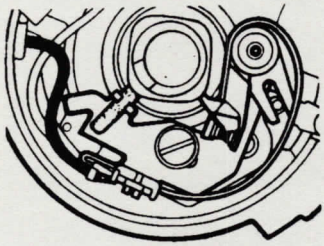
Remove the distributor cap. Remove the rotor arm. Remove the retaining screw (3) and lift the contact set complete from the plate. Press the contact set spring (4) and release the terminal plate and leads from the spring.

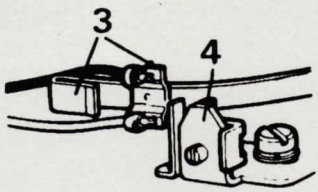


ST349

FIT NEW CONTACTS - ST350

Clean the points with petrol to remove the protective coating. Press the contact spring and fit the terminal plate (6) with the black lead uppermost. Fit the contact set to the moving plate, ensuring that the peg (7), underneath the contact pivot, locates in the hole in the moving plate. The sliding contact actuating fork must also locate over the fixed peg. Loosely secure the assembly with the screw, plain and spring washer. Check that the contact leaf spring (10) locates properly in the insulation shoe. Adjust the contact points, as previously described.





ST350

ELECTRONIC IGNITION (V8 CYLINDER PETROL MODELS) - Fig. RR1249

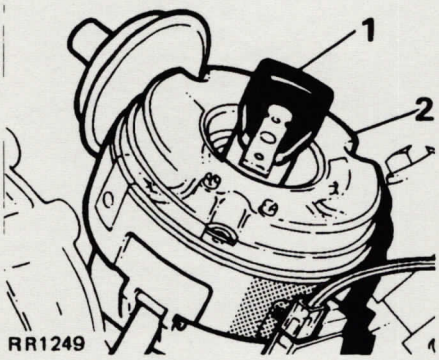
A Lucas model 35DM8 distributor is employed. This is an improved design which produces signals from rotating parts, instead of the 'lever' type contact points associated with earlier designs. This results in improved reliability and greatly reduced maintenance.

MAINTENANCE

40 000 km (24 000 miles). Remove the distributor cap and rotor arm and lubricate the rotor spindle with three drops of oil. 80,000 km (48,000 miles). Remove the distributor cap and rotor arm (1) and wipe inside with a nap-free cloth. Do not disturb the clear plastic insulating cover (2) which protects the magnetic pick-up module.

WARNING: The electronic ignition system involves very high voltages. Inexperienced personnel and wearers of medical pacemaker devices should not be allowed near any part of the high-tension circuit.

Checking of any part of the electronic ignition system must be referred to your Land Rover Dealer or Distributor.



CLEAN/ADJUST SPARK PLUGS (PETROL MODELS) - Fig. ST051

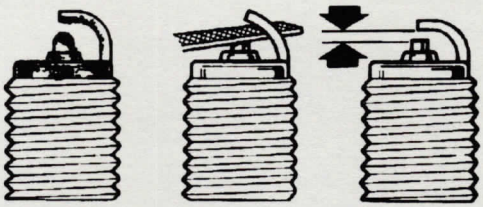
The sparking plugs are fitted with plastic covers.

To gain access to the plugs for cleaning and gap-setting, pull off the plug covers without detaching them from the high tension leads. Using a spark plug spanner and tommy bar, remove the plugs and washers. Examine the spark plugs. If they are in good condition, clean and adjust as follows: Wire-brush the plug threads; open the gap slightly, and vigorously file the electrode sparking surfaces using a point file. This operation is important to ensure correct plug operation by squaring the electrode sparking surfaces. Set the electrode gap to the clearance specified in DATA, Section 6. If satisfactory the plugs and washers may be refitted to the engine but do not overtighten. When pushing the leads on to the plugs, ensure that the shrouds are firmly seated on the plugs.

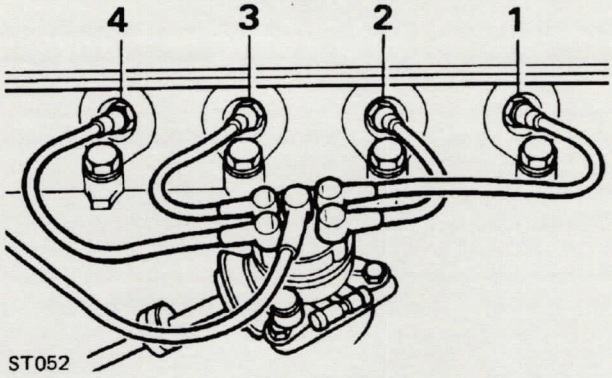
If new spark plugs are required, use only the type specified in Section 6.

Fig. ST051 shows:

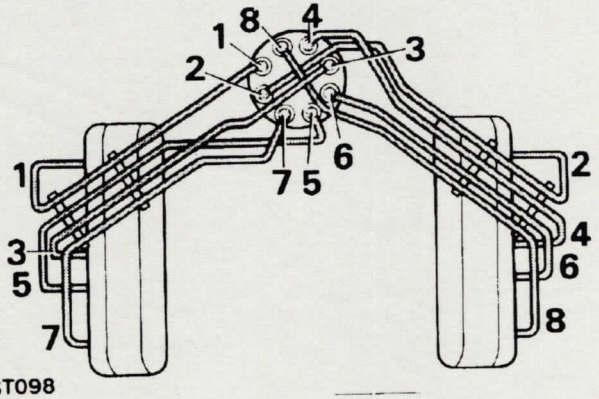
A Dirty plug
B Filing plug electrodes
C A clean plug correctly set



ST051



ST052



ST098

RENEW SPARK PLUGS (PETROL MODELS) - Figs. ST052 and ST098

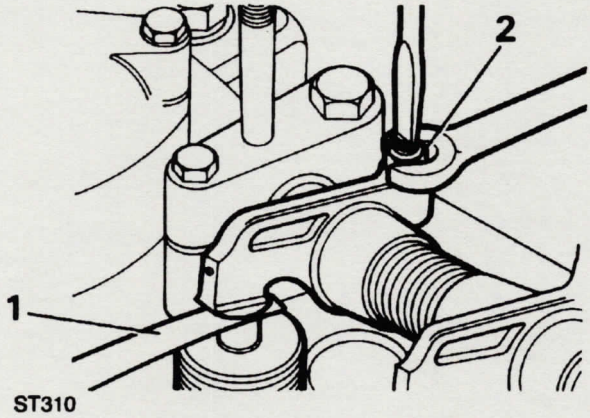
To remove spark plugs proceed as follows:
Remove the leads from the spark plugs.
Using spark plug spanner and tommy bar, remove the plugs and washers.
It is important that only spark plugs specified in Data section are used for replacements.
Incorrect grades of plug may lead to piston over-heating and engine failure.
Wash the new plugs in petrol to remove the protective coating, then set the electrode gaps to the dimension specified in Section 6.
Fit the new plugs and washers to the engine but do not overtighten. Push the leads firmly on.

NOTE: The plug leads must be fitted in the order illustrated or the engine will mis-fire. The 4-cylinder engine is illustrated at the top of this page with the V8 below.

CHECK/ADJUST VALVE CLEARANCES (NOT V8) - Fig. ST310

NOTE: During the following procedure, the crankshaft must be turned a number of times, and this can be made easier if the spark plugs or heater plugs are removed, as applicable.

Turn the engine over until number eight valve (counting from front of engine) is fully open. Using a feeler gauge (1) check the clearance between the valve tip and rocker pad of number one valve.
The correct clearance is:
Petrol and Diesel except Tdi, ... 0.25mm (0.010in)
Tdi 0.20mm (0.008in)
Adjust the clearance by slackening the lock nut (2) and turning the tappet adjusting screw clockwise to reduce clearance and anti-clockwise to increase clearance. Recheck the clearance after tightening the lock nut.



ST310

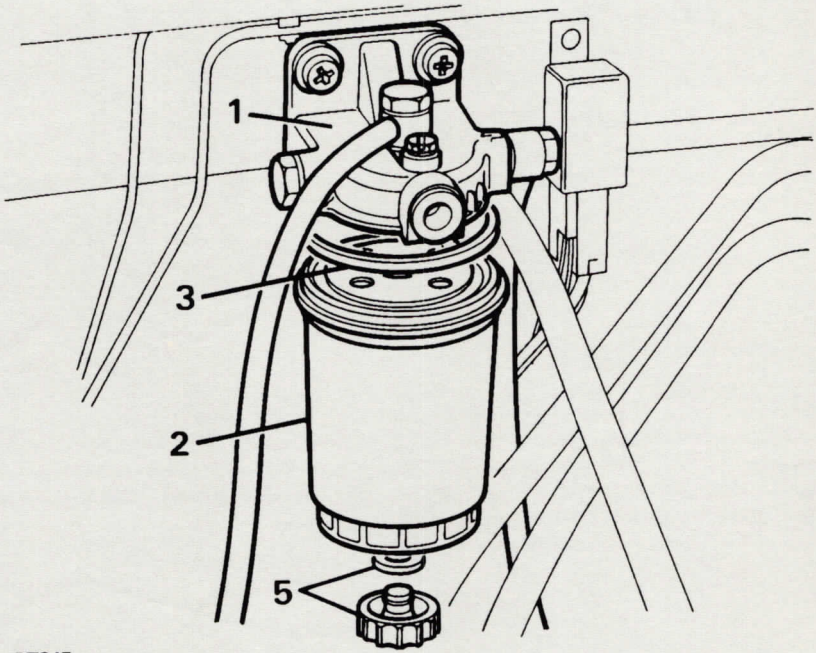
Continue to check and adjust the remaining tappets in the following sequence:
Set No.3 tappet with No.6 valve fully open.
Set No.5 tappet with No.4 valve fully open.
Set No.2 tappet with No.7 valve fully open.
Set No.8 tappet with No.1 valve fully open.
Set No.6 tappet with No.3 valve fully open.
Set No.4 tappet with No.5 valve fully open.
Set No.7 tappet with No.2 valve fully open.

FIT THE ROCKER COVER

Using a new gasket, fit the rocker cover and secure with the dome nuts and washers. Tighten evenly to the correct torque. Do not overtighten.
Refit the spark plugs or heater plugs, as applicable. Tighten them firmly but not excessively.

RENEW FUEL FILTER ELEMENT - DIESEL MODELS - Fig. ST345

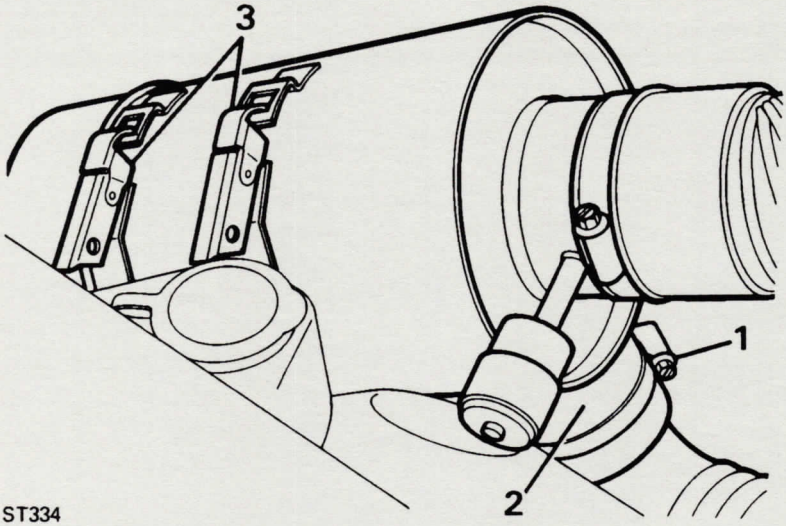
The fuel filter body is located at the rear of the engine bay on the engine bulkhead. Clean the area around the filter head (1) and place a container beneath the filter



ST345

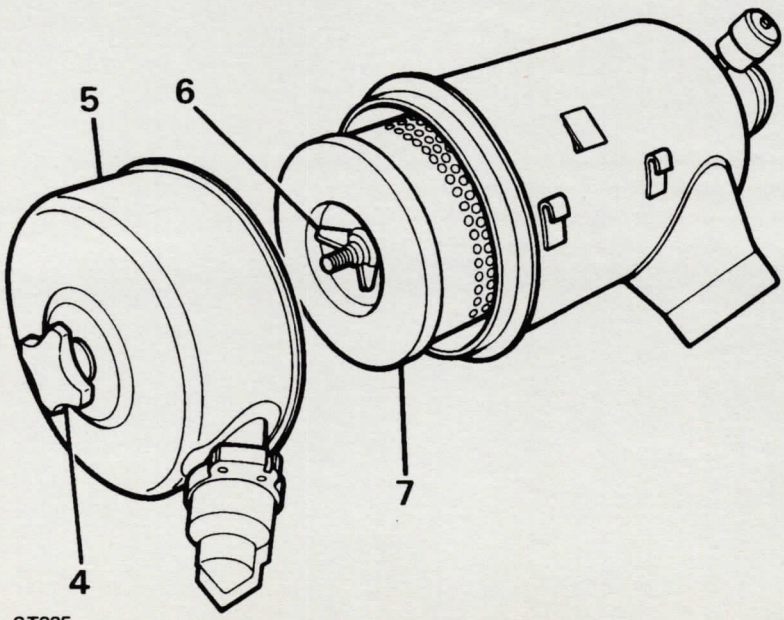
Unscrew the filter (2) and catch the fuel that is released in the container. A large spanner or strap wrench will grip the flats formed on the base of the filter element.
Wet the seal (3) of the new filter element with diesel fuel.
Screw the new filter into position and tighten with a spanner.
Ensure that the drain tap (5) at the base of the filter is closed.

AIR CLEANER ON 4-CYLINDER PETROL AND DIESEL MODELS - Figs. ST334 and ST335
NOTE: The Tdi air cleaner is illustrated, other models are similar.



ST334

Prop open the bonnet. Slacken the clip (1) and disconnect the hose (2) from the air cleaner. Pull up the clips (3) and raise the air cleaner from the cradle. Unscrew the knob (4) and pull off the end cover (5). Unscrew the wing nut (6), remove the sealing washer and pull the element (7) from the frame and discard it.



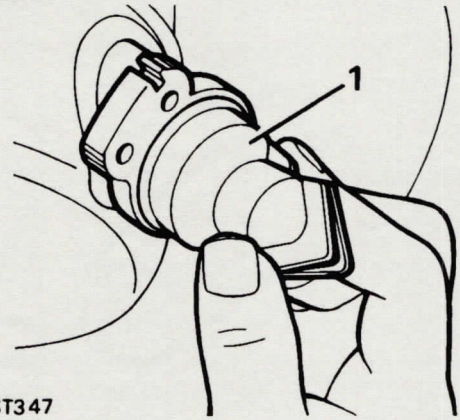
ST335

CHECK AIR CLEANER DUMP VALVE - Fig. ST347

The dump valve provides an automatic drain for the air cleaner and is fitted in the base of the air cleaner support bracket.

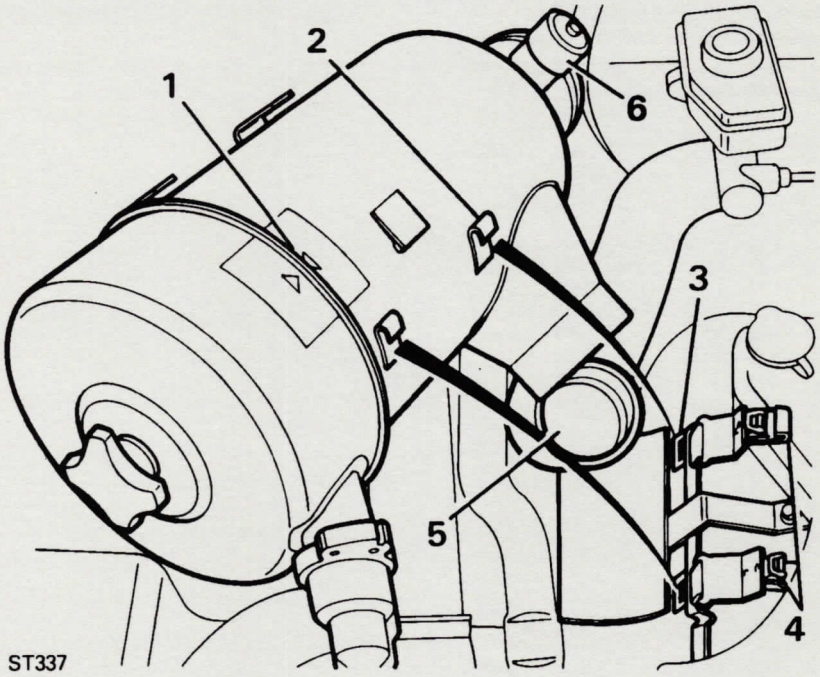
Squeeze open the dump valve (1) and check that the interior is clean. Also check that the rubber is flexible and in a good condition.

If necessary, remove the dump valve to clean the interior. Fit a new valve if the original is in a poor condition.



ST347

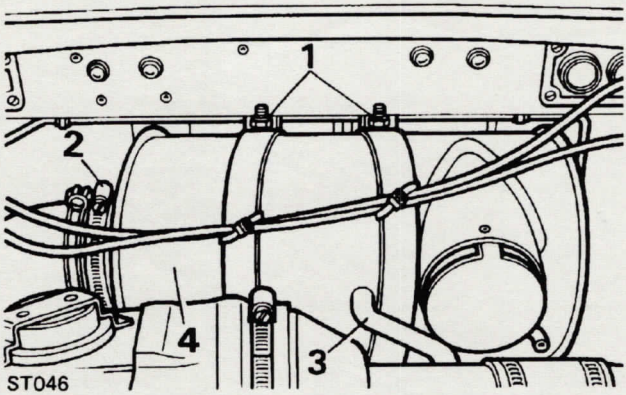
REASSEMBLING - Fig. ST337
Fit a new element and reassemble the air cleaner, aligning the arrows (1) before tightening the cover knob. Locate the air cleaner on to the cradle, engaging the hooks (2) into the cradle slots (3). Fasten the retaining clips (4), reconnect the hose and tighten the clip (5).



Tdi - AIR CLEANER ELEMENT CHANGE INDICATOR - Where fitted - Fig. ST337
Located on the air cleaner case, this indicator clearly shows, by means of a red band moving across a clear aperture, when the filter requires changing. Having changed the filter, reset the indicator by pressing the button (6) until the red band is no longer visible.

AIR CLEANER UNDER ARDUOUS CONDITIONS
When the vehicle is used in dusty, deep wading or field conditions, attention to the air cleaner must be more frequent.

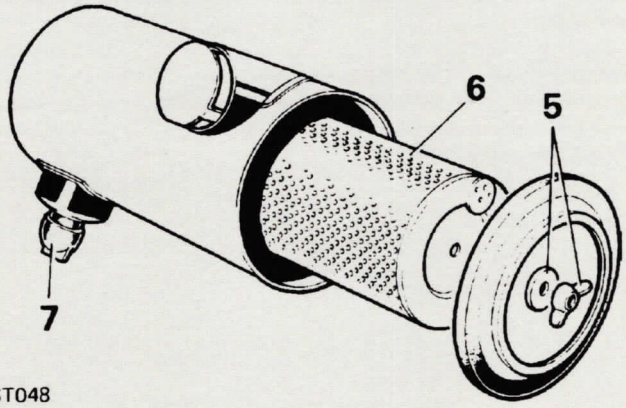
AIR CLEANER (V8 CYLINDER MODELS) - Figs. ST046 and ST048



ST046

REMOVING AIR CLEANER ELEMENT

Unscrew the two air cleaner strap retaining nuts (1). Disconnect the air cleaner hose (2). Remove the engine breather hose (3). Withdraw air cleaner canister (4). Unscrew element wing nut and washer (5) and remove filter. Remove the element (6). The old element should be discarded and a new one fitted during reassembly. If a new element is not available, it may be possible to clean the old one as described on previous pages.



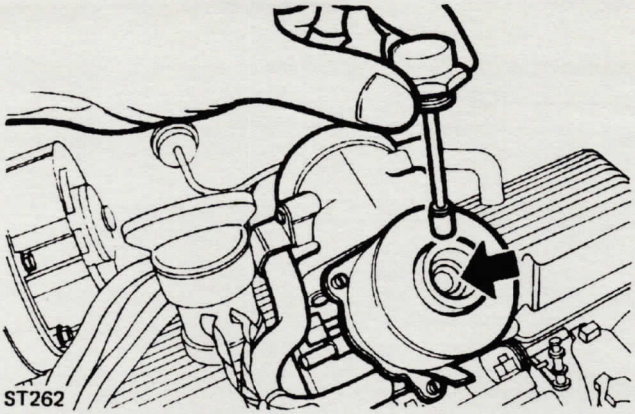
ST048

CHECK AIR CLEANER DUMP VALVE

Squeeze open the dump valve (7) and check that the interior is clean. Also check that the rubber is flexible and in a good condition. If necessary, remove the dump valve to clean the interior. Fit a new valve if the original is in a poor condition.

REASSEMBLING

Fit a new element and reassemble the air cleaner. Replacement procedure is the reverse of the removal.



Carburetters

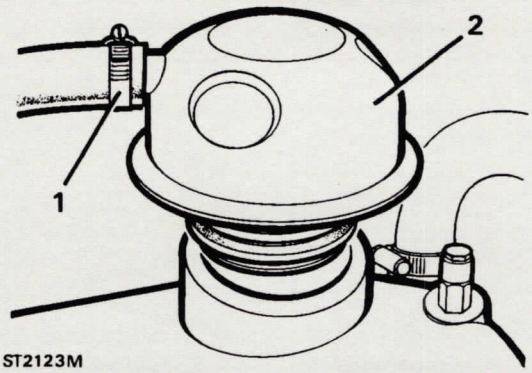
Carburetter mixture ratio and idle speed settings are pre-set at manufacture and must not be interfered with. Under normal circumstances they do not require attention except at major engine overhaul.

However, should it become necessary to check any aspect of carburetter adjustment the work must be carried out by a qualified Land Rover Distributor or Dealer, who has the specialised equipment needed to carry out adjustments to the close limits necessary to ensure that the engine conforms to the legal requirements in respect of exhaust emission.

European Countries - Under no circumstances must the mixture setting be disturbed, as this would almost certainly result in the vehicle failing to meet with legal requirements in respect of air pollution.

Carburetter hydraulic damper - V8 cylinder models - Fig. ST262

1. Unscrew the cap on top of the suction chamber, withdraw cap and plunger. Top up with clean engine oil to bring the level to the top of the hollow piston rod. screw the cap firmly into the carburetter.



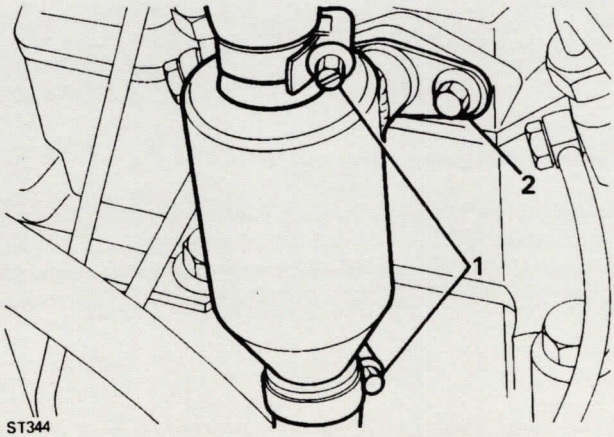
ST2123M

CLEAN ENGINE BREATHER FILTER FOUR CYLINDER MODELS EXCEPT Tdi - Fig. ST2123

The engine breather filter is fitted on top of the engine.
Disconnect the hoses (1) one on Petrol engines, two on Diesels.
Pull the breather filter (2) from the rocket corner.
Wash the gauge filter in clean filter in clean fuel. Drain and allow to dry. Refit the engine breather filter.

CLEAN ENGINE BREATHER CLEANER: Tdi engine - Fig. ST344

Slacken the hose clips (1) securing the hoses to the top and bottom of the cleaner body and pull off the hoses.
Remove the two bolts (2) securing the cleaner to the rocker cover.
Pull away the cleaner from the rocker cover taking care not to tear the sealing gasket.
Immerse the cleaner in a small container of kerosene to dissolve oily deposits which may have accumulated.
When the cleaner is free of deposits, remove it from the solvent and dry it completely.
CAUTION: The cleaner must be completely dry before it is refitted to the engine, otherwise overspeeding of the engine may result.
Refit the cleaner to the rocker cover using a new gasket.
Refit hoses to the cleaner ensuring that the clips are fully tightened for a gas-tight seal.



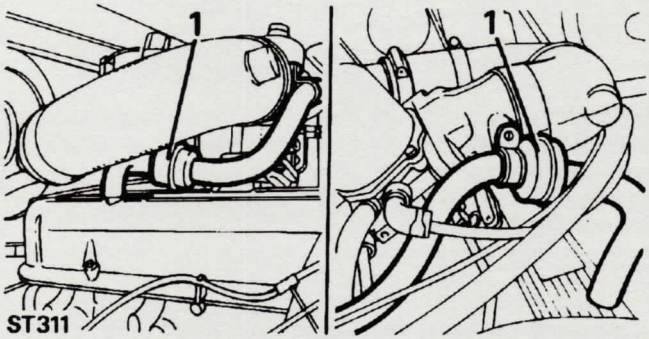
ST344

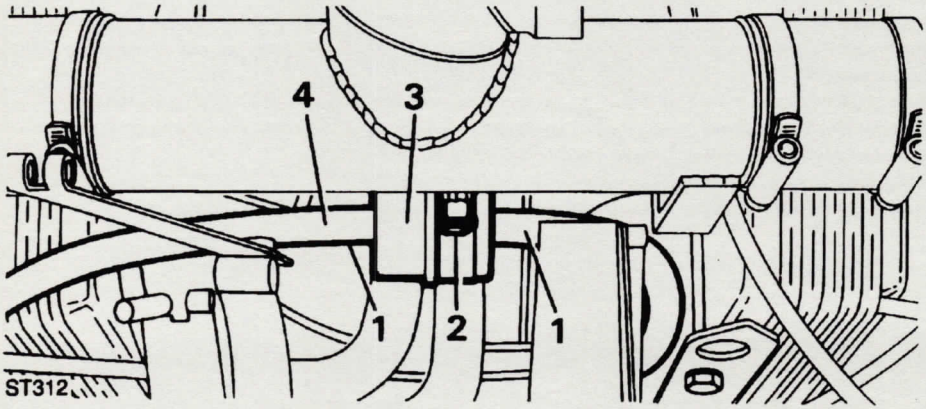
RENEW ENGINE FLAME TRAPS (V8 ONLY) - Fig. ST311

Disconnect the hoses from each side of the left-hand and right-hand flame traps (1) and discard the traps. The right-hand trap is situated beneath the right-hand carburetter inlet elbow.

Examine the hoses and renew any that are perished, split or blocked.

Fit new flame traps to the original or new hoses.

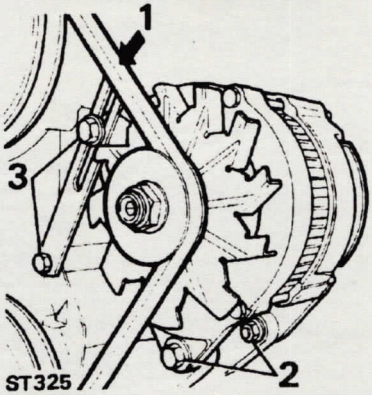




RENEW ENGINE BREATHER FILTER (V8 ONLY) - Fig. ST312

Replace as follows:

Remove the air cleaner as detailed under 'Air cleaner'. Pull off the two hoses (1) from the engine beneath filter, slacken the filter clip (2) and withdraw the filter (3). Fit new filter with end marked 'IN' connected to the hose from the air element (4). Refit hoses and tighten clip.



DRIVE BELTS - GENERAL

Examine all pulleys for damage and check there are no pebbles or grit trapped in the V-grooves that could damage or reduce the life of the drive belts.

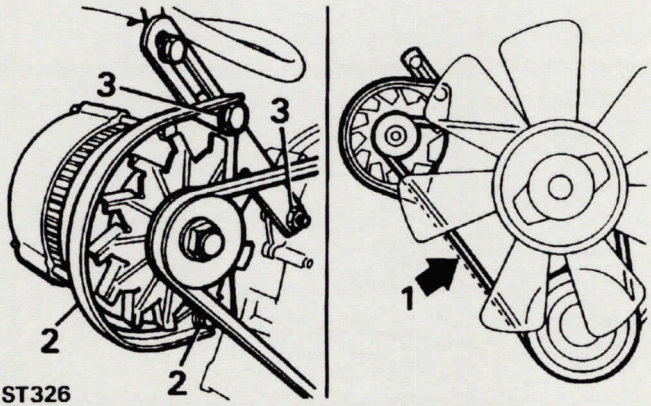
WARNING: Disconnect the vehicle battery before checking or adjusting any of the drive belts, to prevent the possiblity of personal injury if the engine was started.

4-CYLINDER MODELS - Fig. ST325

Check by thumb pressure (1) between the fan and alternator pulleys. Movement should be approximately 9 mm (3/8 in).

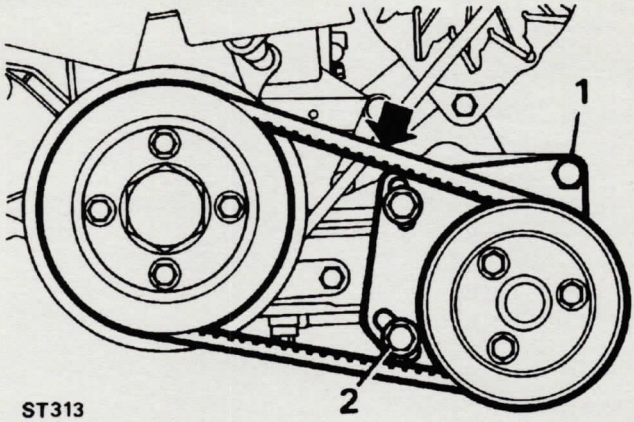
V8 CYLINDER MODELS - Fig. ST326

Check by thumb pressure (1) between alternator and crankshaft pulleys. Movement should be approximately 12 mm (1/2 in).



CHECK FAN DRIVING BELT, ADJUST OR RENEW AS NECESSARY

Whenever a new fan belt is fitted, re-check deflection after approximately 1.500 km (1,000 miles) running. If necessary adjust as follows: Slacken the bolts (2) securing the alternator to the mounting bracket. Slacken the fixings (3) at the top and bottom of the adjustment link. Pivot the alternator inwards or outwards as necessary and adjust until the correct tension is obtained, tighten the bolt at the top of the adjustment link. Finally tighten the nut securing the bottom of the adjustment link and the two mounting bracket bolts.



ST313

CHECK DRIVING BELT FOR POWER STEERING PUMP (WHEN FITTED) - ADJUST OR RENEW AS NECESSARY

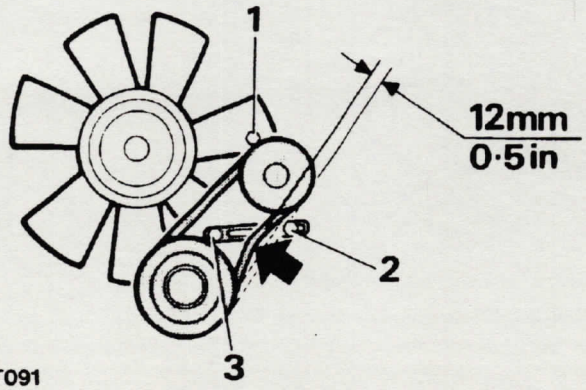
Whenever a new belt is fitted check adjustment again after approximately 1.500 km (1,000 miles) running. Check by thumb pressure the belt tension between the crankshaft and pump pulley. Movement should be approximately 12 mm (0.5 in). If adjustment is necessary:

4-CYLINDER MODELS - Fig. ST313

Slacken the pump pivot bolt (1) and the two adjustment clamp bolts (2) and move the pump mounting plate either up or down, as necessary, within the elongated holes, to achieve the correct belt tension.

CAUTION: DO NOT lever or apply pressure to the pump body to tension the belt since this will cause permanent damage to the pump.

Tighten the clamp bolts first and then the pivot bolt.
Reconnect the battery, turn the engine over a few times and recheck the belt tension.



ST091

V8 CYLINDER MODELS - Fig. ST091

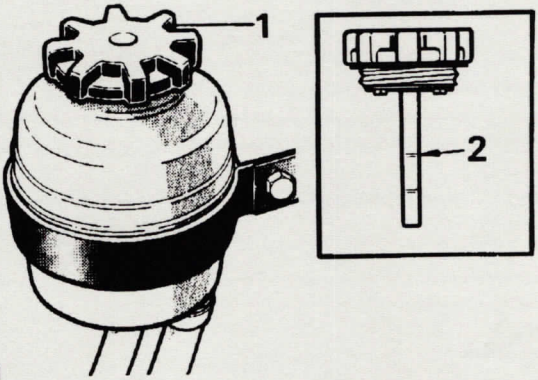
Slacken the nut (1) on the pivot bolt securing the pump mounting bracket to the cylinder head. Slacken the bolt (2) securing the pump lower bracket to the slotted adjustment link. Slacken the bolt (3) securing the slotted adjustment link to the support bracket mounted on the water pump cover. Pivot the pump as necessary and adjust until the correct belt tension is obtained. Maintaining the tension, tighten the pump adjusting bolts and pivot bolt nut and re-check the tension.

CHECK/TOP-UP POWER STEERING RESERVOIR - Fig. LR2241

The power steering units are lubricated by the operating fluid. The only lubrication attention required is to check the reservoir level as follows:

Unscrew the fluid reservoir cap (1) which is fitted with a dipstick.

Check that the fluid is up to the high mark (2) on the dipstick.

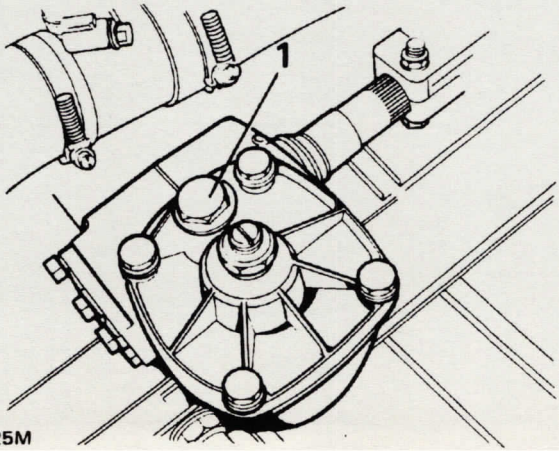


LR2241

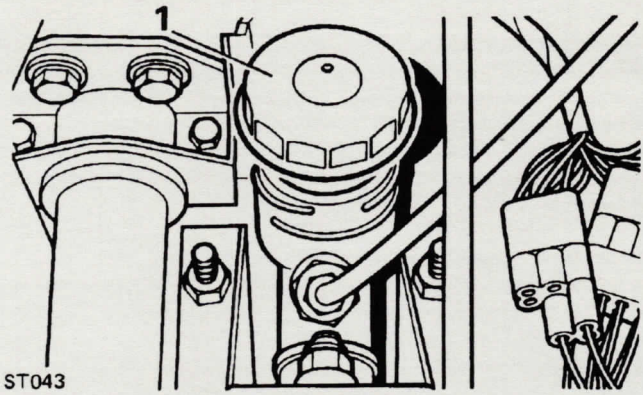
CHECK/TOP-UP MANUAL STEERING BOX - Fig. ST925

Remove the oil filler plug (1) and observe the oil level which should be 25 mm (1.0 in) below the top of the filler hole.

If necessary top-up to the correct level with a recommended oil. Clean and refit the plug and wipe away any surplus oil.

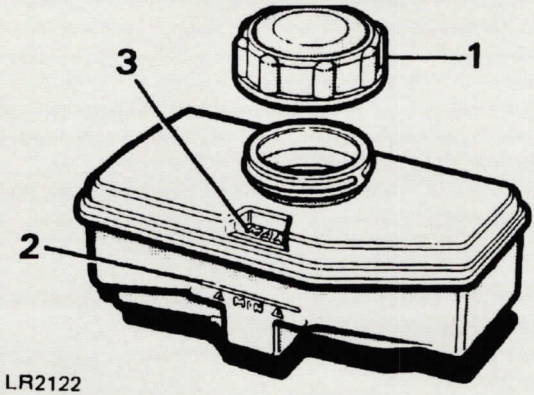


ST 925M



CLUTCH FLUID RESERVOIR - Fig. ST043
Check the fluid level in the reservoir, mounted on the bulkhead adjacent to the brake servo. Remove the cap (1); top-up if necessary to bottom of filler neck. Use the correct fluid specified in Data section.
If significant topping-up is required, check for leaks at master cylinder, slave cylinder and connecting pipes.

CAUTION: When topping-up the reservoir, care should be taken to ensure that fluid does not come into contact with any paintwork on the vehicle.



LR2122

BRAKE FLUID RESERVOIR - Fig. LR2122
The tandem brake fluid reservoir is integral with the servo unit and master cylinder. Check the fluid level as follows:
Unscrew the reservoir filler cap (1).
Check the fluid level in the reservoir.
The level is indicated on the translucent reservoir body (2).
Top-up if necessary with fluid specified in the Data section to the MAX mark (3).
Replace the filler cap.

If significant topping-up is required, check master cylinder, wheel cylinders and brake pipes for leakage; any leakage must be rectified immediately.

CAUTION: When topping-up the reservoir, care should be taken to ensure that brake fluid does not come into contact with any paintwork on the vehicle.
Where a vehicle is operated in extremely dusty conditions, consult your Land Rover Distributor or Dealer for advice on servo air filter change intervals. The filter is situated on the brake pedal side of the servo unit.

LOW FLUID LEVEL/BRAKE CIRCUIT WARNING LIGHT

WARNING: As this test requires the release of the handbrake ensure the vehicle is on level ground and the wheels are chocked.

Normally the warning light remains off, however to check that the circuit is operative, switch on the ignition and release the handbrake. Press the flexible contact located in the filler cap centre, the RED warning light on the instrument panel should illuminate; if it does not energise, and the bulb has not failed, consult your Land Rover Distributor or Dealer immediately.

LUBRICATION

Draining of used oil should take place after a run when the oil is warm. Always clean the drain and filler-level plugs before removing. In the interests of safety chock the wheels and disconnect the vehicle battery to prevent the engine being started and the vehicle moved inadvertently, while oil changing is taking place.
Allow as much time as possible for the oil to drain completely except where blown sand or dirt can enter the drain holes. In these conditions clean and refit the drain plugs immediately the main bulk of oil has drained.
Where possible, always refill with oil of the make and specification recommended in the lubrication charts and from sealed containers.

USED ENGINE OILS

WARNING: Prolonged and repeated contact with used engine oil may cause serious skin disorders, including dermatitis and cancer.
- Avoid excessive contact, wash thoroughly after contact.
- Keep out of reach of children.

PROTECT THE ENVIRONMENT It is illegal in the UK and many other countries to pollute drains, water courses or soil. Use authorised waste disposal facilities, including civic amenity sites and garages providing facilities for receipt of used oil. If in doubt, contact your local Local Authority for advice.

CAUTION: V8 Engines: DO NOT remove the engine oil filter whilst the sump is drained, otherwise the engine oil pump will have to be primed.

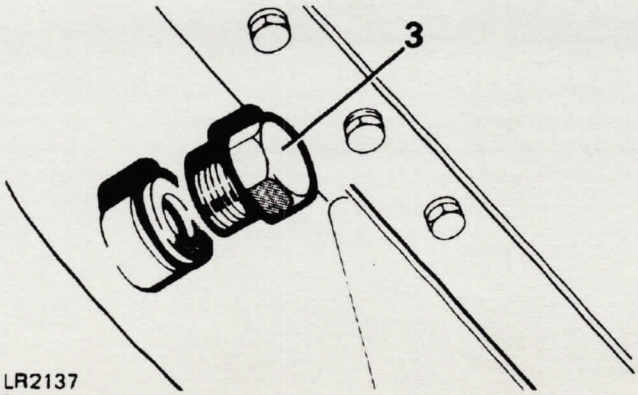
RENEW ENGINE OIL AND FILTER

DRAIN THE OIL - ALL ENGINES - Fig. LR2137

Drive vehicle to level ground and chock the wheels.
Run the engine to warm the oil; switch off the engine and disconnect the battery for safety.
Place an oil tray under the drain plug.

WARNING: Use care when draining the engine oil, if it is very hot it could cause personal scalding.

Remove the drain plug (3) in the bottom of the sump at the left-hand side - V8, and right-hand side 4-cylinder engines. Allow oil to drain away completely and replace the plug and tighten to the correct torque.
NOTE: The example shown below is a 4 cylinder engine sump.



LR2137

REFILL SUMP WITH OIL - ALL ENGINES

Clean the outside of the oil filler cap, remove it from the rocker cover and clean the inside. Pour in the correct quantity of new oil of the correct grade from a sealed container to the high mark on the dipstick and firmly replace the filler cap.

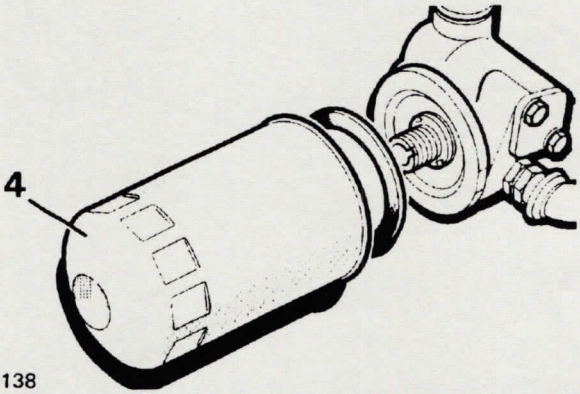
CAUTION: DO NOT fill the sump above the high (H) mark on the dipstick, or engine damage may be caused.

RENEW ENGINE OIL FILTER - ALL ENGINES - Fig. LR2138

Place an oil tray under the engine.

Unscrew the filter (4) anti-clockwise, using a strap spanner as necessary.

Smear a little clean engine oil on the rubber washer of the new filter, then screw the filter on clockwise until the rubber sealing ring touches the machined face, then tighten a further half turn by hand only. Do not overtighten.



LR2138

Reconnect the battery, run the engine and check for leaks from the filter. Stop the engine, allow the oil to run back into the sump for a few minutes, then check the oil level again and top up if necessary.

Remove chocks from the wheels.

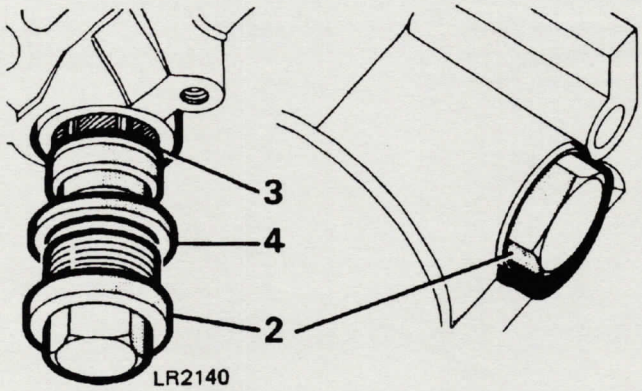
RENEW GEARBOX OIL

Drive the vehicle to level ground, chock the wheels and place a suitable container under the gearbox to catch the old oil.

WARNING: See WARNING'S at the start of the section.

4-CYLINDER ENGINES - Fig. LR2140

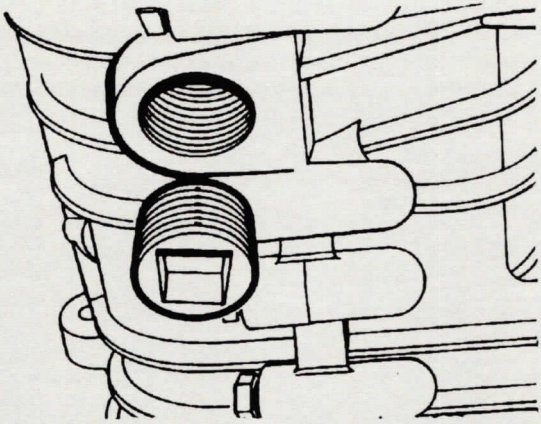
Remove the gearbox and extension case drain plugs (2) and allow the oil to drain completely. Wash the extension case filter (3) in kerosene and refit the plugs using new washer (4), if necessary, and tighten to the correct torque: 25 to 35 Nm.(19 to 26 lbf.ft).



LR2140

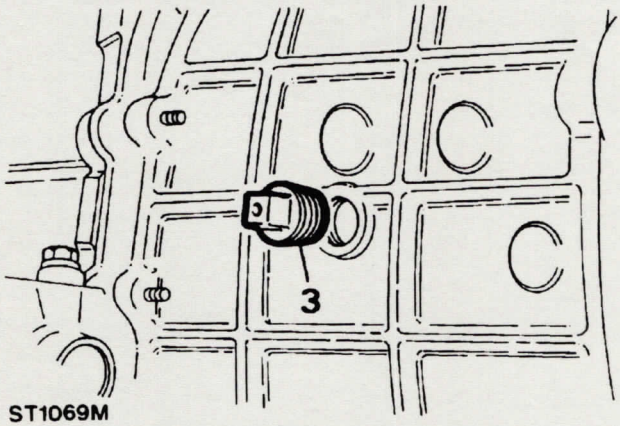
WARNING: See WARNING'S at the start of the section.

V8 ENGINES: Fig. LR2480 Remove the drain plug and allow the oil to drain completely. Refit the plug and tighten to the correct torque: 25 to 35 Nm. (19 to 26 lbf.ft).



LR2480

Remove the oil filler-level plug (3) - Fig. ST1069 and inject the approximate quantity of new oil of the correct make and grade until it begins to run out of the filler-level hole. Fit the plug and tighten to the correct torque: 25 to 35 Nm. (19 to 26 lbf.ft).



ST1069M

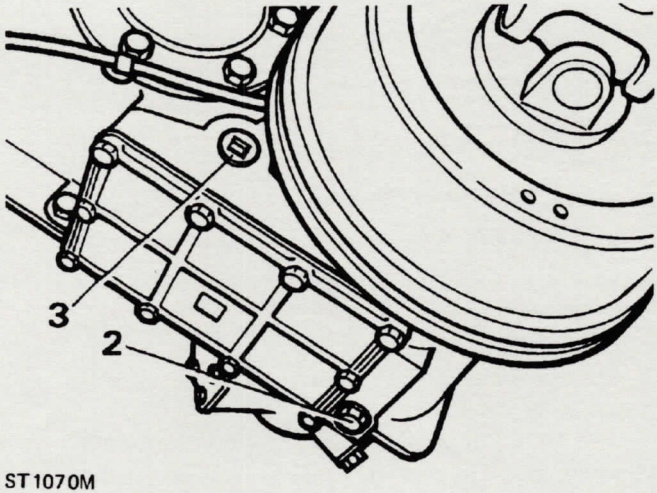
WARNING: See WARNING'S at the start of the section.

DRAIN AND RENEW TRANSFER GEARBOX OIL - Fig. ST1070

Drive the vehicle to level ground, chock the wheels and place a container under the gearbox to catch the old oil.

Remove the drain plug (2) and allow the oil to drain. Fit the plug using a new washer, if necessary, and tighten to the correct torque: 25 to 35 Nm. (19 to 26 lbf.ft).

Remove the filler-level plug (3) and inject the approximate quantity of the recommended oil until it begins to run from the plug hole. Fit the level plug and tighten only to the correct torque 25 to 35 Nm, do not overtighten, wipe away any surplus oil. Remove the wheel chocks.



ST1070M

WARNING: See WARNING'S at the start of the section.

RENEW FRONT AND REAR AXLE OIL - Fig. LR2136

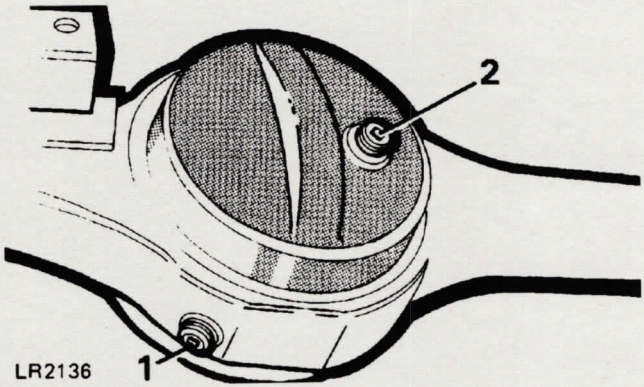
NOTE: A front axle is illustrated, but the procedure is the same for the rear axle.

Drive the vehicle to level ground chock the wheels and place a container under the axle to be drained.

Using a spanner with a 13 mm (0.5 in) square drive remove the drain plug (1) and allow the oil to drain completely. Clean and refit the drain plug.

Remove the oil filler-level plug (2) and inject new oil of a recommended make and grade until it begins to run from the hole. Clean and fit the filler-level plug and wipe away any surplus oil.

Remove the wheel chocks.



LR2136

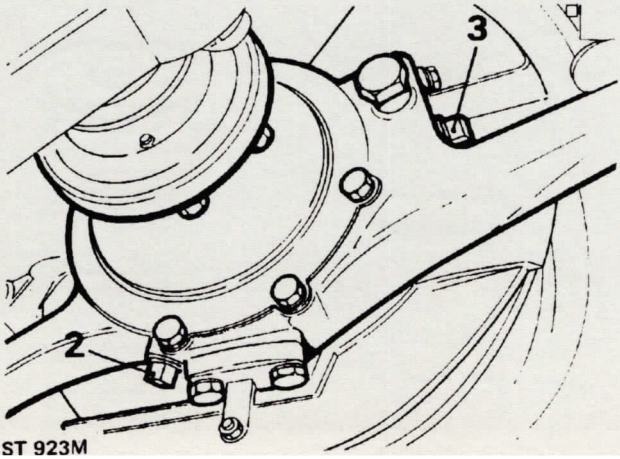
RENEW SWIVEL PIN HOUSING OIL - Fig. ST923M

Drive the vehicle to level ground, chock the wheels and place a container under each swivel housing to catch the used oil.

Remove the drain plug (2) and allow the oil to drain completely and clean and refit the plugs.

Remove the oil filler-level plug (3) and inject the recommended make and grade of oil until oil begins to run from the level hole. Clean and fit the level plugs and wipe away and surplus oil.

Remove the wheel chocks.



ST 923M

WARNING: See WARNING'S at the start of the section.

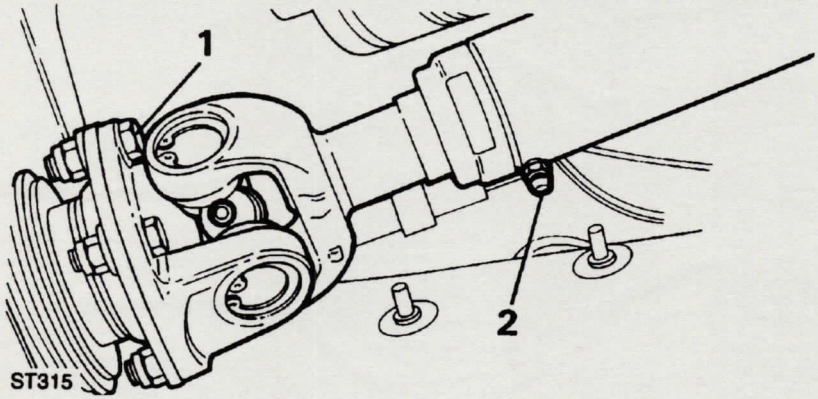
LUBRICATE PROPELLER SHAFTS Fig. ST315

Clean all the grease nipples on the front and rear propshaft universal joints, and sliding portion of the rear shaft.

Charge a low pressure hand grease gun with grease of a recommended make and grade and apply to grease nipples.

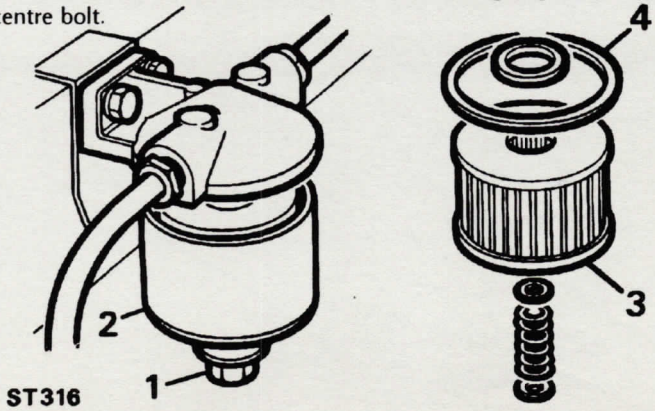
Disconnect one end of the front propeller (1) shaft and compress the sliding portion whilst applying grease to the nipple (2). It is necessary to compress the shaft to prevent over filling with grease. It should be noted that this sliding portion must only be lubricated at 40.000 km (24,000 mile) intervals.

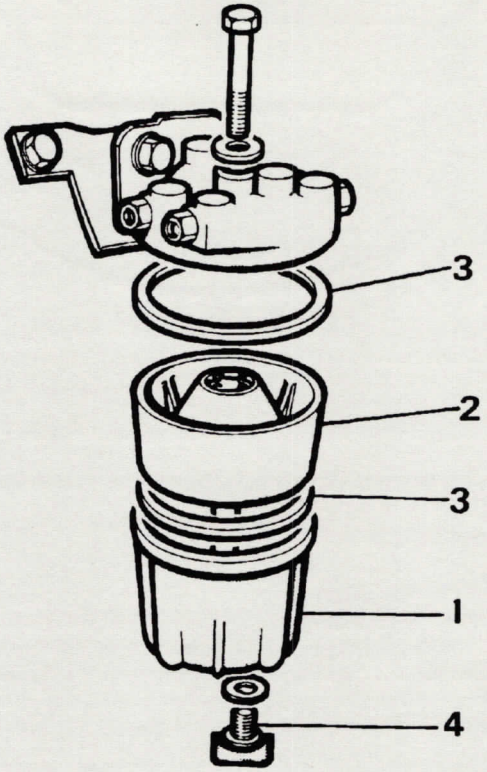
Reconnect the propeller shaft, remove the grease nipple and fit the screwed plug.



RENEW FUEL FILTER ELEMENT (PETROL MODELS) - Fig. ST316

The element provides a filter between the pump and carburetter and is located next to fuel pump on the chassis. Replace as follows: Unscrew the centre bolt (1). Withdraw the filter bowl (2). Remove the small sealing ring and remove element (3). Withdraw the large sealing ring (4) from the underside of the filter head. Discard the old element and thoroughly clean the filter bowl. Ensure that the centre and top sealing rings are in good condition and replace as necessary. Fit new element, small hole downwards. Refit sealing rings. Replace filter bowl and tighten the centre bolt.

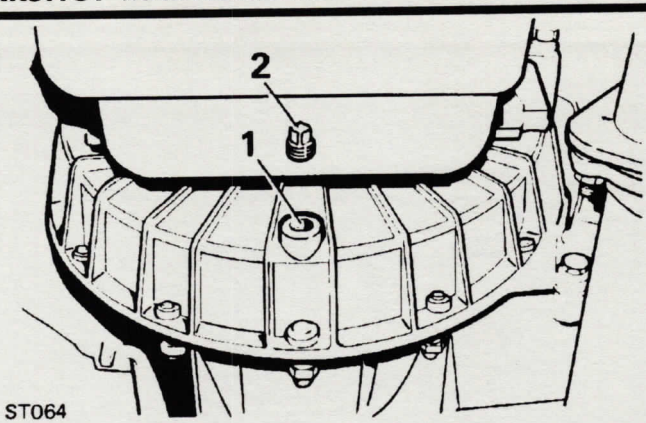




LR2178

CLEAN FUEL SEDIMENTER (where fitted) - DIESEL ONLY. Fig. LR2178
The sedimenter is fitted on the chassis side member, near the rear wheel.

CLEAN ELEMENT
Disconnect fuel inlet pipe at sedimenter and raise pipe above level of fuel tank to prevent draining from tank. Support in this position. Support sedimenter bowl (1) and unscrew bolt on top of unit and remove bowl. Remove the sedimenter element (2). Clean all parts in kerosene. Fit new seals (3) and reverse removal procedure. Slacken off the drain plug (4), when pure diesel fuel runs out tighten plug. If necessary, prime the system. Start engine and check for leaks from sedimenter.



WARNING: See WARNING'S at the start of the section.

DRAIN FLYWHEEL HOUSING IF DRAIN PLUG IS FITTED FOR WADING

4-CYLINDER MODELS - Fig. ST064

V8 CYLINDER MODELS - Fig. ST317

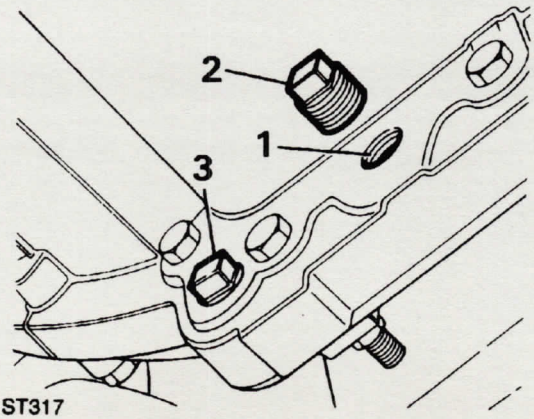
The flywheel housing can be completely sealed to exclude mud and water under severe wading conditions, by fitting a plug in the drain hole (1) at the bottom of the housing. The plug (2) should only to fitted when the vehicle is expected to do wading or very muddy work. When the plug is in use it must be removed periodically and all oil allowed to drain off before the plug is replaced. When the plug is not in use it should be stowed as follows:

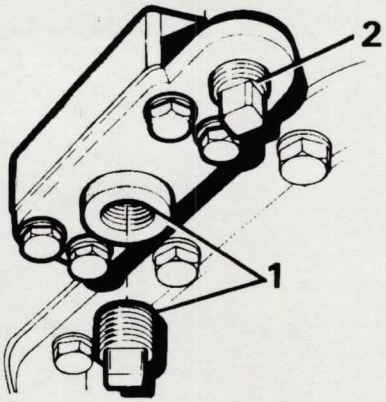
4-CYLINDER MODELS

Plug stowed in vehicle tool kit.

V8 CYLINDER MODELS Fig. ST317

Plug is normally stored in the tool kit, but can also be screwed into the housing (3) near the drain hole.





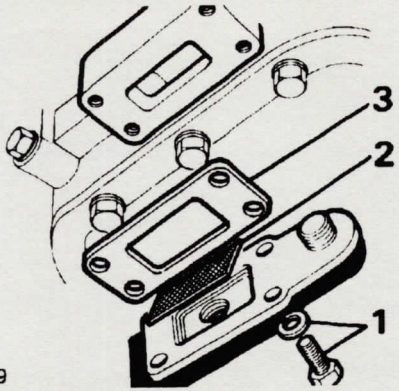
ST332

DRAIN ENGINE FRONT TIMING COVER IF PLUG IS FITTED FOR WADING - DIESEL MODELS (NOT Tdi) - Fig. ST332

WARNING: See WARNING'S at the start of the section.

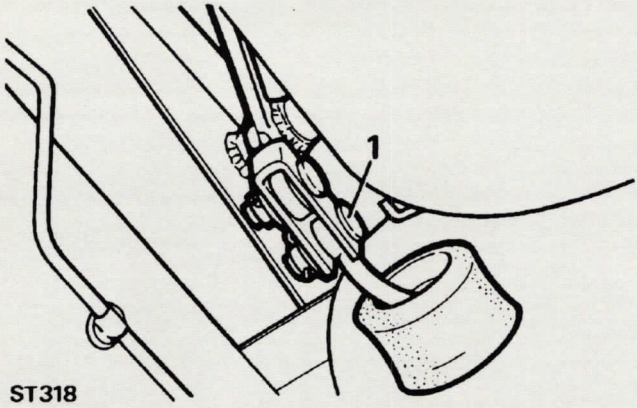
The timing cover can be completely sealed to exclude mud and water under severe wading conditions, by fitting a plug in the drain hole (1) at the bottom of the cover. The plug should only be fitted when the vehicle is expected to do wading or very muddy work. When the plug is in use it must be removed periodically to allow any oil to drain off before the plug is replaced.

NOTE: There should not be any oil in the timing cover, but if there is, the cause should be investigated as soon as possible, as the timing belt will deteriorate if it becomes contaminated with oil.
When the plug is not in use it should be stowed in the tapped hole (2) adjacent to the drain hole.



LR2059

CLEAN FILTER - ENGINE TIMING COVER - DIESEL MODELS (NOT Tdi) - Fig. LR2059
A gauze filter is fitted at the bottom of the engine timing cover to help prevent mud and other debris entering the drain hole, when the wading plug is not in use. The filter must be removed and cleaned periodically, to ensure that it does not become blocked and prevent the timing cover draining properly. Under normal circumstances, the filter should be cleaned at the intervals specified in the Maintenance Schedule or, more frequently if the vehicle operates regularly in wet or dusty conditions. From underneath of a safely parked vehicle, remove the four bolts (1) and plain washers and, withdraw the wading plug plate from the bottom of the timing cover. Wash the filter (2) in kerosene or clean fuel. Brush off any mud or other debris and ensure that the whole filter is clean. Check the condition of the gasket (3) for the wading plug plate. If necessary fit a new gasket. Refit the wading plug plate. Tighten the securing bolts.



ST318

CHECK/ADJUST TRANSMISSION HANDBRAKE - Fig. ST318, ST319 and ST320

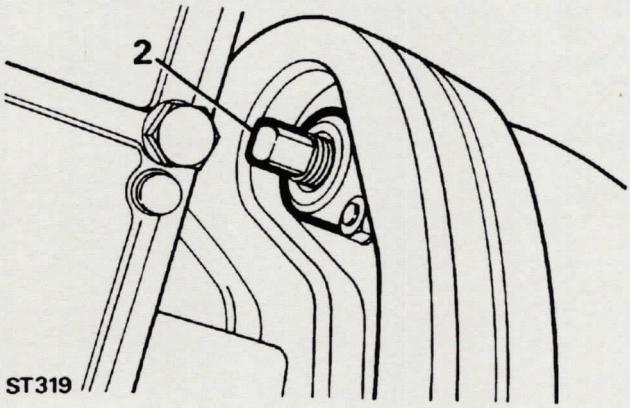
If handbrake movement is excessive, adjust as follows:

Set the vehicle on level ground and chock the wheels.

Release the handbrake fully.

Remove the clevis pin (1) connecting the handbrake lever to the relay at the gearbox end.

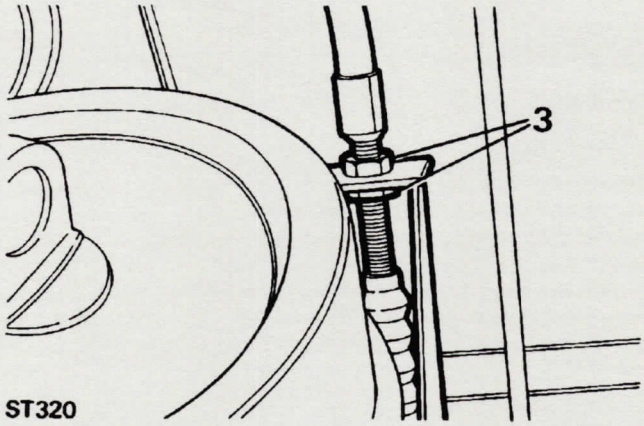
Fully adjust the handbrake shoe assembly (so that it is fully on) by means of the adjuster (2) on the backplate.



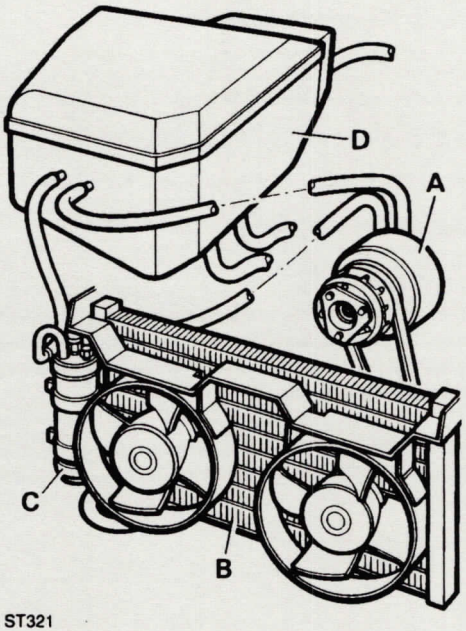
ST319

Adjust the outer sheath of the handbrake cable by means of the two locknuts (3) at the gearbox end until the holes in the clevis on the inner cable line up with the hole of the relay lever.
Fit the clevis pin, washer and a NEW split pin.
Slacken the adjuster 1 or 2 notches until handbrake shoes just clear the drum.
Apply the handbrake gradually. The drum should still rotate on the first ratchet and start to come on at the second ratchet.

CAUTION: DO NOT over adjust the handbrake, the drum must be free to rotate when the handbrake is released, otherwise serious damage will result.



ST320



ST321

AIR CONDITIONING SYSTEM (option) - Fig. ST321

The air conditioning system operates in conjunction with the vehicle heater to provide cooled and dried recirculated or fresh air.

The system is made up of four separate units.

(A) An engine-mounted compressor.
(B) A condenser mounted in front of the radiator.
(C) A receiver/drier unit located in the engine compartment.
(D) An evaporator-heater unit mounted in the engine compartment.

The four units are interconnected by hoses carrying refrigerant. The refrigerant circuit cools the evaporator which is connected to the ventilation system, and thus cools the air as it enters the vehicle. The system delivers hot, cooled, fresh, recirculated and dehumidified air as required to all positions. The installation incorporates temperature, fan speed and distribution controls mounted on the fascia.

WARNING: The air conditioning system is filled at high pressure with a potentially toxic material. Follow service instructions when dismantling or applying excessive heat, e.g., painting, etc. Servicing must only be carried out by a qualified engineer in accordance with instructions in the Repair Operation Manual.

CONDENSER
Using a water hose or air line, clean the exterior of the condenser matrix. Check the pipe connections for signs of fluid leakage.

EVAPORATOR
Examine the pipe connections for signs of fluid leakage.

RECEIVER/DRIER
Check the pipe connections for signs of fluid leakage.

COMPRESSOR
Check the pipe connections for fluid leakage and hoses for swelling.

RECOMMENDED REFRIGERANTS AND OILS
See Data Section 6.

WARNING: Adjustments or rectification procedures should be carried out by your Land Rover Dealer or an approved automotive air conditioning specialist. Under no circumstances should non-qualified personnel attempt repair or servicing of air conditioning equipment.

WARNING: Disconnect the vehicle battery before checking or adjusting any of the drive belts, to prevent the possibility of personal injury if the engine was started.

COMPRESSOR DRIVE-BELT

The belt must be adjusted within the specified limits of total deflection when checked by hand mid-way between the pulleys on the longest run.

Where the belt has stretched beyond the limits, a noisy whine or knock will be evident during operation.

If necessary adjust as follows:

BELT ADJUSTMENT (V8 PETROL MODEL) Fig. ST327

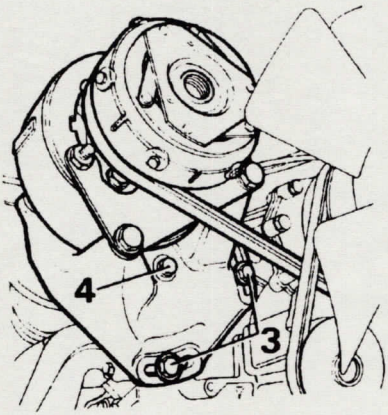
Check by thumb pressure midway between the compressor and the engine fan pulleys. The total deflection of the belt should be aproximately 4 to 6 mm. If necessary adjust as follows:

Slacken the compressor mounting bolts (1) and the pivot bolt (2).

Adjust the position of the compressor to give the correct belt tension of 4 to 6 mm (0.19 to 0.25 in).

CAUTION: DO NOT lever or apply pressure to the compressor body to tension the belt since this will cause permanent damage to the compressor.

Tighten all fixings and recheck the belt tension.



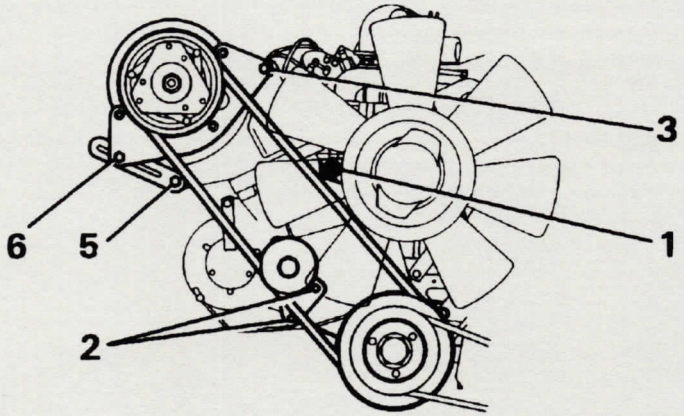
ST327

BELT ADJUSTMENT (4-CYLINDER PETROL AND DIESEL MODELS) - Fig. ST323

Check by thumb pressure (1) between the compressor and crankshaft. The total deflection of the belt should be approximately 12 mm (0.5 in). If necessary adjust as follows:

Slacken the damper clamp bolts (2) and move the damper pulley clear of the belt. Slacken the compressor pivot bolts (3), the adjustment link pivot blot (5) and the adjustment clamp bolts (6). Pivot the compressor clockwise until all slackness is removed from the belt, then tighten the clamp and pivot bolts.

Adjust the position of the damper pulley so that it is just in contact to 1 mm clear of the bolt.



ST323

LUBRICATION CHART AND GENERAL DATA

6

Capacities

The following capacity figures are approximate and are provided as a guide only. All oil levels must be set using the dipstick or level plugs as applicable. Refer to Section 4 for the correct procedure for checking the engine sump.

Component	Litres	Imperial unit
Engine sump oil (4-cylinder)	6,00	10.56 pints
Extra when refilling after fitting new filter (4-cylinder)	0,85	1.50 pints
Engine sump oil (V8 cylinder)	5,10	9.00 pints
Extra when refilling after fitting new filter (V8 cylinder)	0,56	1.00 pint
Main gearbox oil (LT77) 4-cylinder	2,67	4.70 pints
Main gearbox oil (LT85) V8 cylinder	3,00	5.28 pints
Transfer box oil, all models	2,30	4.00 pints
Front differential	1,70	3.00 pints
Rear differential (Ninety models)	1,70	3.00 pints
Rear differential: Salisbury 8HA (One Ten models)	2,26	4.00 pints
Steering box - manual	0,43	0.75 pint
Power steering box and reservoir	2,90	5.00 pints
Swivel pin housing oil (each)	0,35	0.60 pint
Fuel tank, rear (One Ten models)	79,50	17.50 gallons
Fuel tank, side (except One Ten Station wagon)	68,20	15.00 gallons
Fuel tank, side (One Ten Station wagon only)	45,50	10.00 gallons
Fuel tank, side (Ninety models)	54,58	12.00 gallons
Cooling system, 4-cylinder petrol models and naturally aspirated diesel models	10,8	19.0 pints
Cooling system, 4-cylinder diesel models and heavy duty petrol models	10,80	19.00 pints
Cooling system, V8 cylinder models	12,80	22.50 pints
Cooling system, Turbo charged diesel models	11,1	20.0 pints

DIESEL ENGINE OIL

The minimum performance level oil required for satisfactory engine performance and protection is defined by specifications RES 22.OL.PD-2 and CCMC PD-2.

Oil to RES 22.OL PD-2 / CCMC PD-2

Agip Superdiesel or Sint Turbo Diesel

BP Vanellus C3 or Visco Diesel

Caltex RPM Delo 400*

Castrol Syntron X, TXT, Dynamax or GTX

Century Superb

Duckhams QXR or Hypergrade

Esso Superlube EX 2, Superlube +, Ultra Oil or Super Oil

Gulf Super Diesel or Engine Oil T

Mobil Delvac Super, Mobil 1 Rally Formula or Mobil 1 Formula 15W/50

Kuwait Q8 Auto-4 or Q8 Auto-7

Shell Rimula X or Rotella MTX

Texaco Dieseltex

DIESEL ENGINE OIL

Oil Viscosity - Ambient Temperatures Applications Chart

SPECIFICATION	SAE VISCOSITY	AMBIENT TEMPERATURE °C -30° -20° -10° 0° 10° 20° 30° 40° 50°
Oil must meet RES.22.OL.PD-2 or CCMC PD-2	5W/30 5W/40) 5W/50)	
	10W/30 10W/40) 10W/50)	
	15W/40) 15W/50)	
	20W/40) 20W/50)	
	25W/40) 25W/50)	

In markets where oil to the above specifications are not available use products to MIL-L-2104D or API CD.

Under severe operating conditions, eg. off road in mud, airborne sand, dust, operating at high speeds in high ambient temperature above 40°C or continual stop/start operation, the oil and filter change period should not exceed 5000 km (3000 miles). Continuous off road operation in mud, dust and wading conditions requires a monthly oil and filter change. Failure to adhere to the recommended service and operating instructions may result in premature engine wear or damage.

PETROL ENGINE OIL

Recommended Lubricants for ambient temperature above -10°C

BP Visco 2000 Plus 10W/40 or Visco 2000 15/40
Castrol GTX or TXT or Syntron X
Duckhams Hypergrade 15W/50 or QXR
Esso Superlube Ex2 or Superlube +
Mobil 1 Rally Formula or Super
Fine Supergrade
Shell Super Motor Oil or Gemini
Texaco Havoline Multigrade
or other products meeting the specification shown in the following chart

Oil Viscosity - Ambient Temperatures Applications Chart

SPECIFICATION	SAE VISCOSITY	AMBIENT TEMPERATURE °C -30° -20° -10° 0° 10° 20° 30° 40° 50°
Oil must meet RES.22.OL.G-4 or CCMC G-4	5W/30 5W/40) 5W/50)	
	10W/30 10W/40) 10W/50)	
	15W/40) 15W/50)	
	20W/40) 20W/50)	
	25W/40) 25W/50)	

Recommended lubricants and fluids

Service instructions for temperate climates - ambient temperature range -10°C to 35°C

COMPONENTS	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	PETROFINA	SHELL	TEXACO
LT77 - five-speed gearbox - 4-cylinder	BP Autran G	Castrol TQF	Duckhams Q-Matic	Esso ATF Type G	Mobil ATF 210	Fina Purfimatic 33G	Shell Donax TF	Texamatic Universal
LT85 - five-speed gearbox - V8 cylinder	BP Visco 2000 15W/40 or BP Visco 2000 PLUS 10W/40	Castrol GTX 15W/50 or Castrol TXT 10W/40	Duckhams Hypergrade 15W/50	Esso Superlube + Lube 15W/40	Mobil Super 15W/40 or 10W/40	Fina Super grade Motor Oil 15W/40 or 10W/40	Shell Super Motor oil 15W/40 or 10W/40	Havoline Motor Oil 15W/40 or 10W/40

Recommended lubricants and fluids (continued)

COMPONENTS	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	PETROFINA	SHELL	TEXACO
Transfer box Final drive units Swivel pin Housings Steering box	BP Gear Oil SAE 90EP	Castrol Hypoy 90EP	Duckhams Hypoid 90	Esso Gear Oil GX 85W/90	Mobil Mobilube HD 90	Fina Pontonic MP SAE 80W/90	Shell Spirax 90EP	Texaco Multigear Lubricant SAE 85W/90
Prop. shaft Front and rear Lubrication nipples (hubs, ball joints, etc.)	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi- purpose Grease H	Mobil- grease MP	Fina Marson HTL 2	Shell Retinax A	Marfak All purpose Grease
Power steering fluid reservoir as applicable	BP Autran G	Castrol TQ F	Duckhams Q-Matic	Esso ATF Type G	Mobil ATF 210	Fina Purfimatic 23 G	Shell ATF DONAX TF	Texam atic Type G
Brake and clutch reservoirs	Brake fluids having a minimum boiling point of 260°C (500°F) and complying with FMVSS 116 DOT 4							
Cooling system Anti-freeze	Universal Anti-freeze See later page for instructions							

Recommended lubricants and fluids Service instructions all markets

COMPONENTS	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	PETROFINA	SHELL	TEXACO	SPEC. REF. ALL BRANDS
Windscreen hinges Ventilator hinges Ventilator control Seal slides, Hood retention clips. Door lock striker	BP Energrease L2	Castrol LM Grease	Duckhams LB 10	Esso Multi-purpose Grease H	Mobil Mobil-grease MP	Fina Marson HTL2	Shell Retinax A	Marf ak All purpose Grease	NLGI-2 Multi-purpose Lithium-based Grease
Windscreen washers	All Seasons Screen Washer Fluid								
Bonnet pintle	Graphite Lock Grease Type 'B'								
Door locks (anti-burst) Inertia reels	**DO NOT LUBRICATE.** These components are 'life' lubricated at the manufacturing stage.								
Battery lugs Earthing surfaces Where paint has been removed	Petroleum jelly **NOTE:** Do not use Silicone-Grease.								
AIR CONDITIONING SYSTEM Refrigerant	METHYLCHLORIDE REFRIGERANTS MUST NOT BE USED Use only with refrigerant 12. This includes 'Freon 12' and 'Arcton 12'								
Compressor Oil	Shell Clavus 68		BP Energol LPT 68		Sunisco 4GS		Texaco Capella E Wax Free 68		Castrol Icematic 99

Recommended lubricants and fluids
Service instructions for ambient conditions outside temperate climate limits or for markets where the products listed are not available (continued)

COMPONENTS	SERVICE CLASSIFICATION WORLDWIDE		AMBIENT TEMPERATURE °C
	PERFORMANCE LEVEL	SAE VISCOSITY	-30° -20° -10° 0° 10° 20° 30° 40° 50°
Front and rear Axle differential Swivel pin housings LT230 transfer box Steering box	API GL4 or MIL-L-2105	90 EP 80W EP	
Power steering reservoir LT77 gearbox - 4 cyl.	ATF Type G		
LT85 gearbox - V8 cylinder	Oils must meet Rover Group spec. BLS.22.OL.02 or BLS 22 OL 07 or API service levels	10W/30	
	SE or SF or SE/CC	10W/40 10W/50	
	or SE/CD or SF/CC	15W/40 15W/50)	
	SF/CD or the CCMC G2 or G3 service levels	20W/40 20W/50)	
Brake and clutch reservoirs	Brake fluid must have a minimum boiling point of 260°C (500°F) and comply with FMVSS 116 DOT 4		
Lubrication nipples (hubs, ball joints, etc.)	NLGI-2 multipurpose lithium based grease		

Service instructions for ambient conditions outside temperate climate limits or for markets where the products listed are not available

Anti-freeze
Ethylene Glycol based anti-freeze (containing no methanol) with non-phosphate corrosion inhibitors suitable for use in all engines to ensure protection of the cooling system against frost and corrosion.

All engines one part anti-freeze, one part water, i.e. 50% anti-freeze in coolant. Complete protection below -36°C.

Engine, 4-cylinder petrol models

Bore	90,47 mm (3.562 in)
Stroke	97,0 mm (3.819 in)
Number of cylinders	4
Cylinder capacity	2495 cc (152.2 cu in)
Compression ratio	8.0:1
Firing order	1, 3, 4, 2
Sparking plug type	Champion N9YC
Sparking plug point gap	0,72 to 0,88 mm (0.028 to 0.035 in)
Distributor contact breaker gap	0,35 to 0,40 mm (0.014 to 0.016 in)
Dwell angle	49° to 59°
Ignition timing, dynamic; models with emission control	16° BTDC at 2000 rpm with vacuum pipe disconnected when using 90 octane fuel - 2 star rating in UK
In and emergency where dynamic check equipment is not available, the ignition timing can be set statically at TDC. It should be checked and adjusted dynamically as soon as possible	
Tappet clearance, inlet	0,25 mm (0.010 in)) Engine at
Tappet clearance, exhaust	0,25 mm (0.010 in)) running) temperature
Valve timing (No.1 exhaust valve peak)	104° BTDC
Carburetter	Weber 32/34 DMTL
Oil pressure	2.5 to 4,5 kgf/cm^2 (35 to 65 lbf/in^2) at 50 kph (30 mph) in top gear with engine warm

Engine - V8 models

Bore	88,9 mm (3.500 in)
Stroke	71,12 mm (2.800 in)
Number of cylinders	8
Cylinder capacity	3528 cc (215 cu in)
Compression ratio	8.13:1
Firing order	1, 8, 4, 3, 6, 5, 7, 2
Sparking plug type	Champion N9YC
Sparking plug gap	0,88 to 0,72 mm (0.035 to 0.028 ins)
Distributor	Electronic
Ignition timing, dynamic;	6° BTDC at 750 rpm maximum with vacuum pipe connected using (2 star in UK) 90 minimum octane fuel
Carburetters	Twin S.U. type H.I.F. 44
Oil pressure	2,1 to 2,8 kgf/cm^2 (30 to 40 lbf/in^2) at 80 kph (50 mph) in top gear with engine warm

Engine, 4-cylinder Naturally Aspirated diesel models

Bore	90,47 mm (3.562 in)
Stroke	97,0 mm (3.819 in)
Number of cylinders	4
Compression ratio	21.0:1
Cylinder capacity	2495 cc (152 cu in)
Firing order	1, 3, 4, 2
Injection timing	Crankshaft at EP, set injection pump using special tool 18G 1458
Tappet clearance, inlet	0,25 mm (0.010 in)) Engine hot
Tappet clearance, exhaust	0,25 mm (0.010 in)) or cold
Valve timing (No. 1 exhaust valve peak)	106° to 109°
Oil pressure	2,5 to 4,5 kgf/cm^2 (35 to 65 lbf/in^2) at 50 kph (30 mph) in top gear with engine warm

Engine - Tdi Diesel models

Bore	90,47 mm (3.562 in)
Stroke	97,0 mm (3.819 in)
Number of cylinders	4
Compression ratio	19.5:1
Cylinder capacity	2495 cc (152 cu in)
Firing Order	1, 3, 4, 2
Injection timing	1,54 mm lift at T.D.C.
Tappet Clearance, inlet	0,20 mm (0.008 in) - Engine hot
Tappet Clearance, exhaust	0,20 mm (0.008 in) - or cold
Valve timing (No. 1 exhaust valve peak)	106° to 109°

Main gearbox - 4-cylinder petrol and Naturally Aspirated diesel models

Type - Manual	5-speed helical constant mesh, with synchromesh on all forward gears	
Main gearbox ratios	Fifth (Cruising gear)	0.831:1
	Fourth	1.000:1
	Third	1.507:1
	Second	2.301:1
	First	3.585:1
	Reverse	3.701:1

Main gearbox - V8 and Tdi models

Type - Manual	5-speed helical constant mesh, with synchromesh on all forward gears	
Main gearbox ratios	Fifth (Cruising gear)	0.770:1
	Fourth	1.000:1
	Third	1.397:1
	Second	2.132:1
	First	3.692:1
	Reverse	3.429:1

Main gearbox - V8 models with a gross vehicle weight of 3500kg and over

Type - Manual	LT85 5-speed constant mesh with synchromesh on all forward gears	
Main gearbox ratios	Fifth (Cruising gear)	0.795:1
	Fourth	1.000:1
	Third	1.436:1
	Second	2.181:1
	First	3.650:1
	Reverse	3.824:1

Transfer gearbox

Type	LT230T. Two-speed reduction on main gearbox output. Front and rear drive permanently engaged via a lockable differential.

	High	Low
One Ten models		
4 cylinder petrol and Naturally Aspirated diesel models	1.667:1	3.320:1
V8 and Tdi models	1.411:1	3.320:1
Ninety Models		
4 cylinder petrol, Naturally Aspirated diesel and Tdi models	1.411:1	3.320:1
V8 models	1.222:1	3.320:1

Rear axle	
Type - Ninety models	Spiral bevel
Type - One Ten models	Hypoid; full floating shafts
Ratio - All models	3.538:1
Front axle	
Differential	Spiral bevel
Front wheel drive	Enclosed constant velocity joint
Ratio	3.538:1

Overall ratio (including final drive) - Ninety models		high	low
V8 models	Fifth	3.331:1	9.050:1
	Fourth	4.326:1	11.753:1
	Third	6.043:1	16.419:1
	Second	9.227:1	25.057:1
	First	15.971:1	43.391:1
	Reverse	14.833:1	40.300:1
Tdi models	Firth	3.846:1	9.050:1
	Fourth	4.995:1	11.753:1
	Third	6.978:1	16.419:1
	Second	10.649:1	25.057:1
	First	18.441:1	43.391:1
	Reverse	17.127:1	40.300:1
4 cylinder petrol and Naturally Aspirated diesel	Fifth	4.151:1	9.767:1
	Fourth	4.995:1	11.753:1
	Third	7.527:1	17.711:1
	Second	11.493:1	27.043:1
	First	17.907:1	42.134:1
	Reverse	18.468:1	43.497:1

Overall gear ratios (including final drive) - One Ten models		high	low
V8 and Tdi models	Fifth	3.846:1	9.050:1
	Fourth	4.995:1	11.753:1
	Third	6.978:1	16.419:1
	Second	10.649:1	25.057:1
	First	18.441:1	43.391:1
	Reverse	17.128:1	40.300:1
4 cylinder petrol and Naturally Aspirated diesel models	Fifth	4.903:1	9.767:1
	Fourth	5.901:1	11.753:1
	Third	8.893:1	17.711:1
	Second	13.579:1	27.043:1
	First	21.156:1	42.134:1
	Reverse	21.840:1	43.497:1

Steering (lock to lock)	
Manual	4.3 turns
Power assisted	4.0 turns
Camber angle	Zero
Castor angle	3°
Swivel pin inclination	7°
Front wheel toe-out - permanent 4-wheel drive	1,19-2,38 mm (3/64 - 3/32 in)
Turning circle between kerbs:	
NINETY models:	
750 x 16 tyres	12,3 m (40.34 feet)
205 x 16 tyres	11,7 m (38.38 feet)
ONE TEN models	
750 x 16 tyres	12,8 m (41.98 feet)

Electrical system

Type	Negative earth	
Voltage	12	
Battery - Petrol models	BBMS No. 371	) 9 plate
	BBMS No. 291	) Designation
		) 190/84/90
- Diesel models	BBMS No. 372 14 plate Designation 210/85/90	
Charging circuit - 4-cylinder models	Alternator	
- V8 cylinder models	Alternator	
Ignition system - Petrol models	Coil	

Replacement bulbs and units

Headlamps		
- UK	75/50 W Sealed beam unit	
- Europe (except France)	60/55 W Halogen bulb	) Local legislative
		) requirements
- France and Algeria	60/55 W Halogen bulb, yellow	) may require
		) fitment of
- Rest of world, right-hand steering	75/50 W Sealed beam unit	) quartz-halogen
		) headlamps in
- Rest of world, left-hand steering	60/50 W Sealed beam unit	) countries outside
		) Europe.
Front side lamps	12 V 5 W	) Refer to
		) Distributor or
		) Dealer
Side repeater lamps	12 V 4 W	) for details
Stop/tail lamps	12 V 21/5 W	
Flasher lamps	12 V 21 W	
Number plate lamp	12 V 4 W	
Reverse lamp	12 V 21 W	
Rear fog guard lamp bulb	12 V 21 W	
Interior lamp	12 V 21 W	
Warning lights (except diesel cold start)	12 V 1.2 W	
- diesel cold start	12 V 1.2 W	
Instrument illumination	12 V 3 W	
Hazard switch warning light	12 V 0.6 W	

* The 60/55 W Halogen bulb is fitted to the Land Rover 'County' Station Wagon

Vehicle Dimensions - Ninety models

		Soft Top			Pick-up			Hard Top			Station Wagon		
		2.5P	3.5P	2.5D	2.5P	3.5P	2.5D	2.5P	3.5P	2.5D	2.5P	3.5P	2.5D
DIMENSIONS													
Overall Length	mm (in)	3722 (146.5)			3722 (146.5)			3883 (152.9)			3883 (152.9)		
Overall Width	mm (in)	1790 (70.5)			1790 (70.5)			1790 (70.5)			1790 (70.5)		
2400kg Height +	mm (in)	1965 (77.4)			1963 (77.3)			1972 (77.6)			1963 (77.3)		
2550kg Height +	mm (in)	2000 (78.7)			1993 (78.5)			1997 (78.6)			1989 (78.3)		
Wheelbase	mm (in)	2360 (92.9)			2360 (92.9)			2360 (92.9)			2360 (92.9)		
Track Front/Rear	mm (in)	1486 (58.5)			1486 (58.5)			1486 (58.5)			1486 (58.5)		
Cargo Bed Length	mm (in)	1144 (45.0)			1144 (45.0)			1144 (45.0)			1144 (45.0)		
Interior Width	mm (in)	1620 (63.8)			1620 (63.8)			1620 (63.8)			1620 (63.8)		
Interior Height	mm (in)	1215 (47.8)			-			1215 (47.8)			1215 (47.8)		
Width between Wheel Boxes	mm (in)	925 (36.4)			925 (36.4)			925 (36.4)			925 (36.4)		
Seating Capacity		2 - 7			2 - 7			2 - 7			6 - 7		
PERFORMANCE													
Tyre size fitted		6.00 x 16			205 x 16						7:50 x 16 (except XS)		
Min. Turning Radius (kerb to kerb)	m (ft)	5,75 (18.9)			5,85 (19.2)						6,15 (20.2)		
Max. Gradient	(EEC kerb weight)	45°			45°						45°		
Approach Angle	(EEC kerb weight)	47°			48°						51°		
Departure Angle	(EEC kerb weight)	48°			49°						52°		
Ramp Break Over Angle		149°			150°						146°		
Min. Ground Clearance (unladen)	mm (in)	198 (7.8)			191 (7.5)						229 (9)		
Wading Depth	mm (in)	500 (20)			500 (20)			500 (20)					

TOWING WEIGHTS (Refer to Section 3 Towing off-road)				
Towing Weights	2.5 PETROL	3.5 PETROL	2.5 DIESEL	2.5 DIESEL TURBO
Unbraked Trailers	750kg	750kg	750kg	750kg
Trailers with Over Run Brakes	3500kg	3500kg	3500kg	3500kg
4-wheel Trailers with coupled brakes * FULLY BRAKED	4000kg	4000kg	3500kg	4000kg

+ Height depends upon suspension and tyres specified. **NOTE: All weight figures are subject to local legal restrictions.**

*** Only applies to vehicles modified to accept coupled brakes.**

IMPORTANT: See NOTE in Section 3, "Towing" for towing a trailer with a weight in excess of 3,500 Kg.

Vehicle Dimensions - One Ten models

		Soft Top			Pick-up			Hard Top			Station Wagon			High Capacity Pick-up		
		2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P	2.5P	2.5D	3.5P
DIMENSIONS																
Overall Length	mm (in)	4438 (175)			4438 (175)			4599 (181.1)			4599 (181.1)			4631 (182)		
Overall Width	mm (in)	1790 (70.5)			1790 (70.5)			1790 (70.5)			1790 (70.5)			1790 (70.5)		
2950kg Height	mm (in)	2035 (80.1)			2035 (80.1)			2035 (80.1)			2035 (80.1)			2035 (80.1)		
3050kg Height	mm (in)	2079 (81.9)			2064 (81.3)			2073 (81.6)			2059 (81.1)			2076 (81.7)		
Wheelbase	mm (in)	2794 (110)			2794 (110)			2794 (110)			2794 (110)			2794 (110)		
Track Front/Rear	mm (in)	1486 (58.5)			1486 (58.5)			1486 (58.5)			1486 (58.5)			1486 (58.5)		
Cargo Bed Length	mm (in)	1900 (74.8)			1900 (74.8)			1900 (74.8)			-			2010 (79.2)		
Interior Width	mm (in)	1620 (63.8)			1620 (63.8)			1620 (63.8)			1620 (63.8)			1660 (65.3)		
Interior Height	mm (in)	1205 (47.4)			-			1205 (47.4)			1205 (47.4)			-		
Width between Wheelboxes	mm (in)	925 (36.4)			925 (36.4)			925 (36.4)			925 (36.4)			1090 (43)		
Seating Capacity		2 - 3 - 11			2 - 3 - 11			2 - 3 - 11			9 - 10 - 11 - 12			2 - 3		
PERFORMANCE																
Tyre size					7.50 x 16											
Min. Turning Radius	m (ft)							6.4 (21)								
Max. Gradient								45° max								
Approach Angle								50° (at EEC kerb weight)								
Departure Angle								35° (at EEC kerb weight)								
Ramp Break Over Angle								152°								
Min. Ground Clearance	mm (in)							215 (8.5)								
Wading Depth	mm (in)							500 (20)								
TOWING WEIGHTS (Refer to Section 3 Towing off-road)																
Towing Weights					2.5 PETROL			3.5 PETROL			2.5 DIESEL			2.5 DIESEL TURBO		
Unbraked Trailers					750kg			750kg			750kg			750kg		
Trailers with Over Run Brakes					3500kg			3500kg			3500kg			3500kg		
4-wheel Trailers with coupled brakes * FULLY BRAKED					4000kg			4000kg			3500kg			4000kg		

+ Height depends upon suspension and tyres specified. **NOTE: All weight figures are subject to local legal restrictions.**

*** Only applies to vehicles modified to accept coupled brakes.**

IMPORTANT: See NOTE in Section 3, "Towing" for towing a trailer with a weight in excess of 3,500 Kg.

Vehicle Weights - NINETY MODELS

When loading a vehicle to its maximum (Gross Vehicle Weight), consideration must be taken of the unladen vehicle weight and the distribution of the payload to ensure that axle loadings do not exceed the permitted maximum values.
It is the customer's responsibility to limit the vehicle's payload in an appropriate manner such that neither maximum axle loads nor Gross Vehicle Weight are exceeded.

	Soft Top				Pick Up				Hard Top				Station Wagon			
Model - Petrol/Diesel	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5T D	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5TD
Gross Vehicle Weight	Standard Suspension: 2400															
EEC Kerb Weight	1606	1602	1643	1643	1624	1620	1661	1661	164 8	1644	1685	1685	1690	1686	1727	1727
Gross Vehicle Weight	High Load Suspension: 2550															
EEC Kerb Weight	1610	1602	1647	1647	1628	1620	1665	1665	1652	1644	1689	1689	1694	1686	1731	1731

MAXIMUM AXLE WEIGHTS

	Ninety Standard	Ninety High Load
Front Axle Kg:	1200	1200
Rear Axle Kg:	1380	1500
GVW Kg:	2400	2550

*EEC Kerb Weight = Unladen Weight + Full Fuel Tank & 75 Kg Driver.

Vehicle Weights - ONE TEN MODELS

When loading a vehicle to its maximum (Gross Vehicle Weight), consideration must be taken of the unladen vehicle weight and the distribution of the payload to ensure that axle loadings do not exceed the permitted maximum values.
It is the customer's responsibility to limit the vehicle's payload in an appropriate manner such that neither maximum axle loads nor Gross Vehicle Weight are exceeded.

	Soft Top				Pick Up				Hard Top				Station Wagon				High Capacity Pick Up			
Petrol/Diesel	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5TD	2.5P	3.5P	2.5D	2.5TD
Gross Vehicle Weight	Unlevelled Suspension: 3050																			
EEC Kerb Weight	1723	1698	1742	1742	1724	1699	1743	1743	1777	1752	1796	1796	1887	1862	1906	1906	1813	177 8	1859	1859
Gross Vehicle Weight	Levelled Suspension: 2950																			
EEC Kerb Weight	1733	1708	1752	1752	1734	1709	1753	1753	1787	1762	1806	1806	1897	1872	1916	1916	1823	178 8	1869	1869

MAXIMUM AXLE WEIGHTS

	One Ten Levelled	One Ten Unlevelled
Front Axle Kg:	1200	1200
Rear Axle Kg:	1750	1850
GVW Kg:	2950	3050

* EEC Kerb Weight = Unladen Weight + Full Fuel Tank & 75 Kg Driver.

FUEL ECONOMY

Passenger Car Fuel Consumption Order 1983 No. 1486 80/1268 EEC

NINETY MODELS

	Sim Urban Cycle (mpg)	Const Speed 56 mph (mpg)	Const Speed 75 mph (mpg)
Ninety 2.5 Petrol:	16.3	22.8	N/A
Ninety 2.5 Diesel:	26.6	28.2	N/A
Ninety Tdi 205-16 tyres	28.3	32.2	21.2
Diesel: 750-16 tyres	29.7	33.5	22.2
Ninety 3.5 Petrol:	14.1	22.2	14.9
	Sim Urban Cycle 1/100 Km	**Const Speed 90 Kph 1/100 Km**	**Const Speed 120 Kph 1/100 Km**
Ninety 2.5 Petrol:	17.3	12.4	N/A
Ninety 2.5 Diesel:	10.6	10.0	N/A
Ninety Tdi 205-16 tyres	9.9	8.8	13.3
Diesel: 750-16 tyres	9.5	8.4	12.7
Ninety 3.5 Petrol:	20.0	12.7	19.0

ONE TEN MODELS

	Sim Urban Cycle (mpg)	Const Speed 56 mph (mpg)	Const Speed 75 mph (mpg)
One Ten 2.5 Petrol:	14.5	21.0	N/A
One Ten 2.5 Diesel:	21.6	24.7	N/A
One Ten Tdi Diesel:	28.8	29.6	19.0
One Ten 3.5 Petrol:	13.0	21.0	14.8
	Sim Urban Cycle 1/100 km	**Const Speed 90 kph 1/100 km**	**Const Speed 120 kph 1/100 km**
One Ten 2.5 Petrol:	19.4	13.5	N/A
One Ten 2.5 Diesel:	13.1	11.4	N/A
One Ten Tdi Diesel:	9.8	9.5	14.8
One Ten 3.5 Petrol:	21.7	13.4	19.1

The above results were achieved under controlled test conditions in compliance with the Order, and do not express or imply any guarantee of the fuel consumption of any particular vehicle with which this information may be supplied. Vehicles are not individually tested, and there are inevitably differences between individual vehicles of the same model. In addition, the vehicle may incorporate particular modifications. Furthermore, the driver's style and road traffic conditions, as well as the extent to which the vehicle has been driven and the standard of maintenance will all affect its fuel consumption. Information as to the results of officially approved tests on all vehicles tested is available for inspection by customers on the premises where these vehicles are displayed.

One Thirty Crew Cab Model

		V8 (kg)	Turbo D (kg)
Gross Vehicle Weight	Front Axle Rear Axle **Total**	1,580 2,200 **3,500**	1,580 2,200 **3,500**
* Unladen	**Total**	**1,872**	**1,936**
* EEC Kerb Weight	Front Axle Rear Axle **Total**	1,027 985 **2,012**	1,070 1,015 **2,085**
* EEC Payload		1,488	1,415

* Applies to Land Rover 130 Crew Cab with standard rear High Capacity Pick-up body.

NOTE:

* EEC Kerb Weight = Unladen Weight + Full Fuel Tank & 47kg driver.
* EEC Payload = GVW - EEC Kerb Weight. However individual axle weights must not be exceeded.
* Front and Rear Axle weights are non additive.
* For off road use the Front Axle is restricted to a maximum capacity of 1450kg.

Vehicle weights and loads

When loading the vehicle, distribute the weight as evenly as possible between the front and rear axles, ensuring that all cargo is secure. **DO NOT** place a heavy load over or behind the rear axle which would lower the rear of the vehicle and raise the front, as this would affect the steering and general handling.

When loading a vehicle to its maximum (Gross Vehicle Weight) consideration must be taken of the unladen vehicle weight, the distribution of the load and tow hitch loading (where appliable) to ensure that axle loadings do not exceed the specified maximum figures.

NOTE: To accommodate different loading conditions (such as vehicles fitted with optional equipment) the sum of the maximum allowable front and rear axle loads exceed the Gross Vehicle Weight. Therefore, it is the drivers responsibility to limit the vehicle's load in an appropriate manner so that neither maximim axle loads nor the Gross Vehicle Weight is exceeded.

NOTE: All other vehicle details are the same as those given for the Land Rover 110" in this Driver's Handbook.

One Thirty Crew Cab Model

TYRE PRESSURES		NORMAL LOADS AND ROAD SPEEDS	EMERGENCY SOFT 25 mph (40 km/h) MAXIMUM SPEED
FRONT (7,50-16)	bar	3,03	1,1
	lbf/in^2	44	16
	kgf/cm^2	3,09	1,12
REAR (7,50-16)	bar	4,5	2,2
	lbf/in^2	65	32
	kgf/cm^2	4,6	2,25

WARNING: Tyre pressures must be checked with the tyres cold, as the pressure is about 0.21 bar (3 lbf/in^2) 0.2 kg/cm^2 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.

TYRE PRESSURES

Maximum tyre life and performance will only be obtained if the tyres are maintained at the correct pressures.

	Tyres - size and type		Normal All load conditions		Emergency soft			
					Unladen		Laden	
			Front	Rear	Front	Rear	Front	Rear
90 MODELS	205R16 RADIAL-PLY	bar	1,9	2,4	1,1	1,1	1,1	1,6
		lbf/in^2	28	35	16	16	16	23
		kgf/cm^2	2,0	2,5	1,1	1,1	1,1	1,6
	7.50R16 RADIAL-PLY	bar	1,9	2,7.5	1,1	1,1	1,1	1,6
		lbf/in^2	28	40	16	16	16	23
		kgf/cm^2	2,0	2,8	1,1	1,1	1,1	1,6
110 MODELS	750R16 RADIAL-PLY	bar	1,9	3,3	1,1	1,1	1,1	1,8
		lbf/in^2	28	48	16	16	16	26
		kgf/cm^2	2,0	3,4	1,1	1,1	1,1	1,8

General Notes:

- Emergency soft pressures should only be used in extreme conditions where extra floatation is required. Max. speed 40 km/h (25 mph). Return pressure to normal immediately firm ground is regained.
- For extra ride comfort at part load the normal rear tyre pressures may be reduced to following:
  - 90 models - Not more than 1050kg rear axle load.
    1,9 bar (28 lbf/in^2) 2,0 kgf/cm^2
  - 110 models - Not more than 1250 kg rear axle load.
    Cross-ply and radial tyres: 2,2 bar (32 lbf/in^2) 2,25 kgf/cm^2
- Towing: when vehicle is used for towing the reduced rear tyre pressures for extra ride comfort are not applicable.
  Where special tyres or tyres other than those quoted are fitted to the vehicle, consult your Land Rover Distributor or Dealer or the tyre Manufacturer for correct tyre pressures.

DEFENDER TYRE CHARACTERISTICS

TYRE	SIZE	APPLICABLE MODEL	COMMENTS
Michelin XM & S 8 Ply Rating	205 x 16 Radial	Standard fit 90 and V8 models Optional others	Dual purpose, good traction: snow, mud, adverse conditions, low rolling resistance improves M.P.G.
Avon Rangemaster 6 Ply Rating	750 x 16 Radial	Option 110 all models Option 90 2.5 Litre models	Dual purpose, good traction on and off road. Low rolling resistance improves M.P.G.
Michelin XC Type L 8 Ply Rating	750 x 16 Radial	Optional all models	Recommended for all off-road conditions, self cleaning. Resistance to accidental damage.
Michelin XS 6 Ply Rating	750 x 16 Radial	Optional all models	Ideal for sand or similar conditions, maximum flotation heavy loads at reduced pressures, reasonable on-road life.
Michelin X Type 4 x 4 8 Ply Rating	750 x 16 Radial	Optional all models	Dual purpose, good on-road life excellent traction off-road, protector ply in sidewall for off-road.
Michelin XZY 12 Ply rating	750 x 16 Radial	Optional all models	General purpose tyre. Good wear characteristics. Designed to run at low pressures if necessary. Resistance to sidewall intrusion.

FORECOURT DATA

Fuel	4-cylinder petrol engines	90 octane minimum) 2 star ** UK rating) unleaded or
	V8 cylinder petrol engines	91 to 93 octane) leaded
	4-cylinder diesel engines	Diesel fuel (DERV) (Not exceeding 1% sulphur content. See Fuel Recomendations, Section 3)
	Tank capacity	
	- 90 models	Side tank 54,58 litres (12 gallons) Rear tank 79,5 litres (17.5 gallons)
	- 110 models	Side tank (except Station wagon) 68,2 litres (15 gallons) Side tank (Station wagon only) 45,5 litres (10 gallons)
Engine Oil	Viscosity grade	15W/40 for all models. See DATA section for full details.
	Topping-up	Maintain oil level between marks on dipstick as follows: - 4-cylinder models between 'L' and 'H' notches Tdi models between MIN and MAX notches - V8 cylinder models between 'LOW' and 'HIGH' marks Quantity of oil required to raise level from 'L' to 'H' or 'LOW' to 'HIGH' MIN to MAX as applicable: - 4-cylinder models: 1,0 litre (1.75 pints) - V8 cylinder models: 1,4 litre (2.5 pints)
Tyre pressures		See inside rear cover

PARTS AND ACCESSORIES

7

LAND ROVER PARTS LIMITED

Land Rovers and Range Rovers are unique, so the parts and accessories for your vehicles have been designed by specialists and manufactured to stringent quality standards. Genuine Parts by Land Rover Parts Limited are THE ONLY replacement parts approved by Land Rover Engineering and built to orginal equipment specification for performance you can rely on. Safety is of fundamental importance with any replacement parts and although there may be cheaper products available, Genuine Parts are the only ones on the market in which vehicles users can have complete confidence.

Each Genuine Part has undergone stringent tests for quality and performance and is guaranteed for 12 months with unlimited mileage. A complete range of Genuine Accessories is also available, styled to match the individuality of Land Rover and Range Rover and manufactured to match the performance of the vehicles. These too have the seal of approval from the engineers of Land Rover following rigorous testing on and off the vehicles.

Accessories range from the hardworking Husky winch, towing equipment and Power Take Offs to items for interior and exterior protection, including sheepskin or waterproof seat covers, loadspace protectors, nudge bars and lamp guards to the digital radio/cassettes or cellular telephones and a stylish range of leisurewear.

Land Rover Parts Service to the World

The Land Rover Parts Worldwide distribution network serves thousands of customers. In the United Kingdom Genuine Parts, Accessories and Leisurewear are delivered to over 100 authorised UK dealers. In the unlikely event that the part you require is not in stock, with the dealer, it can be ordered on our 'Vehicle Off-road' emergency services direct through a computer link with Land Rover Parts.

Overseas, we have franchised representation in over 100 countries and, with over half of all Land Rover and Range Rover vehicles exported, an efficient export after sales parts service is of paramount importance.

So, wherever you are in the World from the United Kingdom to Uganda, feel assured that Land Rover Parts specialist support and friendly assistance is always close at hand.

Remember though, only Land Rover Genuine Parts are designed, manufactured and rigorously tested to original equipment specification.
Fitment of anything other than Genuine Parts will not only invalidate your warranty but also constitute a serious risk to you and your passengers safety and your vehicles performance and reliability.

LAND ROVER GENUINE PARTS

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WARNING: Tyre pressures must be checked with the tyres cold, as the pressure is about 0.21 bar (3 lbf/in²) 0.2 kg/cm² 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.

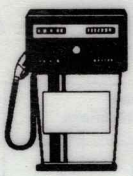
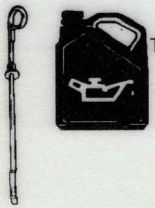
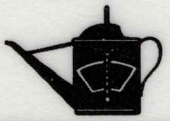
TYRE PRESSURES

Maximum tyre life and performance will only be obtained if the tyres are maintained at the correct pressures.

	Tyres - size and type		Normal All load conditions Front	Rear
90 MODELS	7.50-16 CROSS-PLY	bar	1,9	2,4
		lbf/in²	28	35
		kgf/cm²	2,0	2,5
	205R16 RADIAL-PLY	bar	1,9	2,4
		lbf/in²	28	35
		kgf/cm²	2,0	2,5
	7.50R16 RADIAL-PLY	bar	1,9	2,75
		lbf/in²	28	40
		kgf/cm²	2,0	2,8
110 MODELS	7.50-16 CROSS-PLY	bar	1,9	2,9
		lbf/in²	28	42
		kgf/cm²	2,0	3,0
	750R16 RADIAL-PLY	bar	1,9	3,3
		lbf/in²	28	48
		kgf/cm²	2,0	3,4

DEFENDER 90 · 110 · 130

FORECOURT DATA

Fuel 	4-cylinder petrol engines V8 cylinder petrol engines 4-cylinder diesel engines	90 octane minimum) 2 star ** UK rating 91 to 93 octane) unleaded or leaded Diesel fuel (DERV) (Not exceeding 1% sulphur content. See Fuel Recomendations, Section 3)
	Tank capacity - 90 models - 110 models	Side tank 54,58 litres (12 gallons) Rear tank 79,5 litres (17.5 gallons) Side tank (except Station wagon) 68,2 litres (15 gallons) Side tank (Station wagon only) 45,5 litres (10 gallons)
Engine Oil 	Viscosity grade Topping-up	15W/40 for all models. See DATA section for full details and the special oils for diesel engines. Maintain oil level between marks on dipstick as follows: - 4-cylinder models between 'L' and 'H' notches - 200Tdi models between MIN and MAX notches - V8 cylinder models between 'LOW' and 'HIGH' marks Quantity of oil required to raise level from 'L' to 'H' or 'LOW' to 'HIGH' MIN to MAX as applicable: - 4-cylinder models: 1,0 litre (1.75 pints) - V8 cylinder models: 1,4 litre (2.5 pints)
Coolant 		Universal anti-freeze. See Data Section 6 for proprotions of solutions.
Windscreen Washer Bottle 		All Seasons Screen Washer Fluid.
Tyre Pressure		See over