(AP 113, Book 3 Sect 2E)

AIR PUBLICATION
5073A (UH)

Issued 1977

TRUCK, FIRE FIGHTING, TAC RV 6 x 4, MK2 RANGE ROVER

USER HANDBOOK

BY COMMAND OF THE DEFENCE COUNCIL

Frank Cooper.

FOR USE IN THE ROYAL AIR FORCE

PRODUCED TO THE REQUIREMENT OF THE MINISTRY OF DEFENCE
BY DIRECTOR OF QUALITY ASSURANCE
(FIGHTING VEHICLES AND ENGINEER EQUIPMENT)

U 4391 /1

AMENDMENT RECORD

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NOTES TO READERS

This publication has been prepared by the manufacturer primarily for the **standard 4x4 Range Rover** civilian vehicle. The book is applicable to the vehicles designated on the front cover only in respect to the driving controls and chassis. An **additional** non-driven load carrying axle has been added, placed to the rear of the driven axle. A supplement at the back of the book gives further details of the axle and other features.

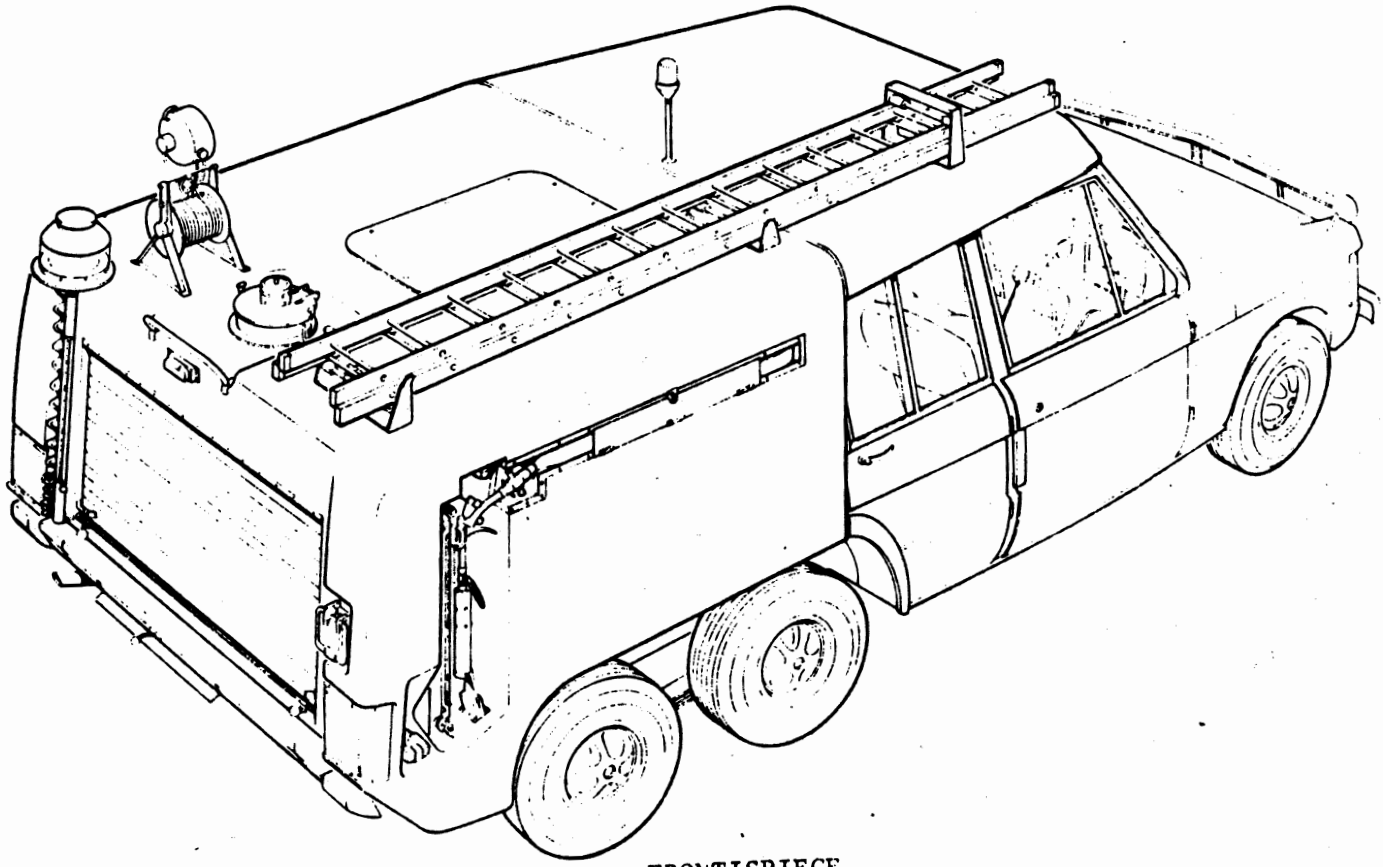
The subject matter of this publication may be affected by Defence Council Instructions, General Orders and Modification Leaflets in AP4545 Series and in the Associated Publications listed below or even in some others. If possible, Amendment Lists are issued to correct this publication accordingly, but it is not always practical to do so. When an Instruction Order or Leaflet contradicts any portion of this publication, the Instruction, Order or Leaflet must be taken as the overriding authority.

The inclusion of references to other items of equipment does not constitute authority for demanding the items.

The lubricants to be used will be those given in the Air Diagram and maintenance carried out in accordance with AP3260.

ASSOCIATED PUBLICATIONS

	Air Publication
Technical Handbook (Chassis and Controls)	5073A Vol 1 & 6
Technical Handbook (Top Hamper)	5061 Vol 1 & 6
RAF Engineering - MT	1464E
Electrical Manual for MT and Marine Craft	4343M
General Orders and Modifications	4545 Series
Lubrication Air Diagram	AD8310
Daily, before and after use and weekly servicing	AD8288/B27



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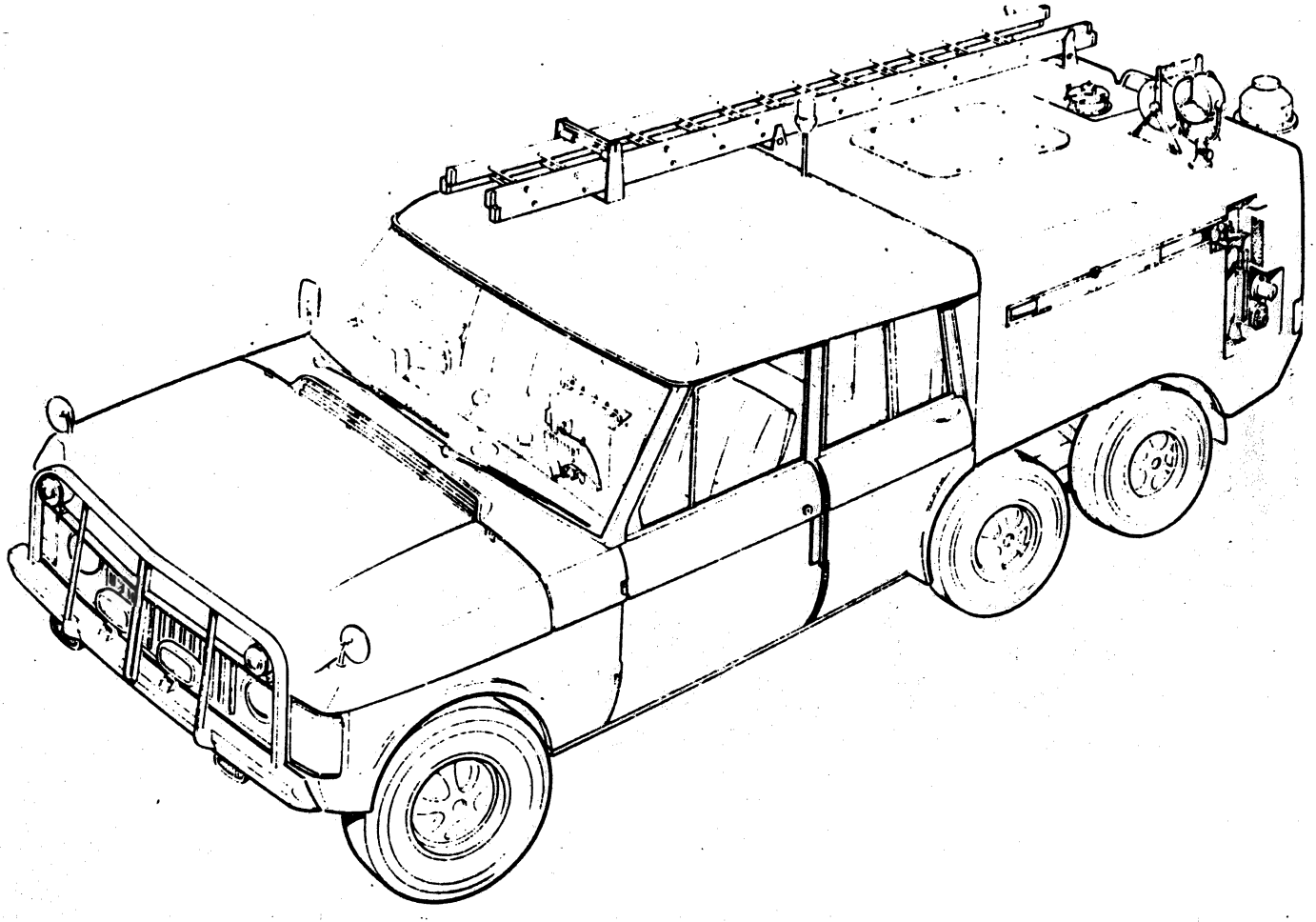


Range Rover Owner's Manual

Rover Triumph—Sales
Coventry CV4 9DB

Rover Triumph —Service
Coventry CV4 9DB

Jaguar and Rover Triumph—Parts and Accessories
Box No. 150, Coventry CV4 9DB

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 Manufacturers' policy of constant product improvement.

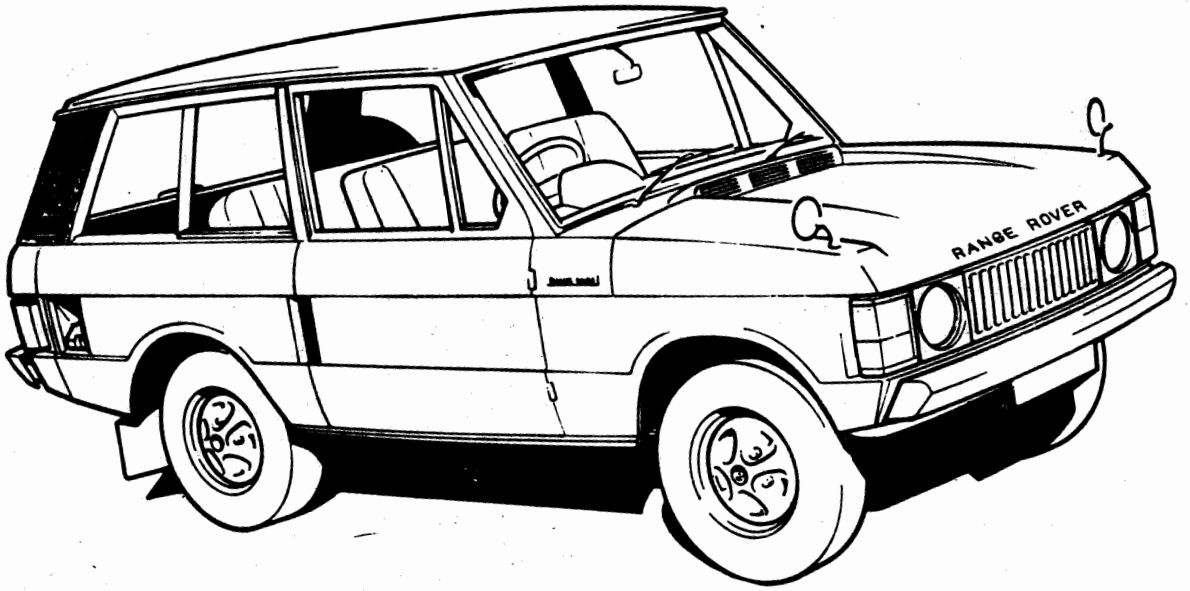
Whilst every effort is made to ensure the accuracy of the particulars contained in this Handbook, neither the Manufacturer nor the Distributor or Dealer by whom this Handbook is supplied, shall in any circumstances be held liable for any inaccuracy or the consequences thereof.

By Appointment to Her Majesty Queen Elizabeth II — *Manufacturers of Motor Cars and Land-Rovers*

By Appointment to Her Majesty Queen Elizabeth the Queen Mother — *Suppliers of Motor Cars and Land-Rovers*

BRITISH LEYLAND **Rover**

English Version Part No. 606917.



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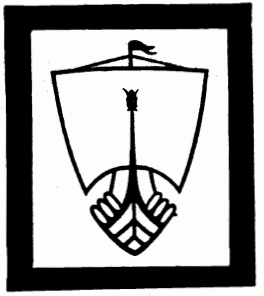
Introduction

The information in this Manual has been divided into eight sections to facilitate reference to any particular aspect of the vehicle. Sections One to Five cover driving the vehicle, the use of the instruments and various controls, running requirements and a Service Guide. They should be carefully studied so you not only get the best out of the vehicle in terms of economical and efficient operation but also obtain maximum pleasure and enjoyment when driving.

Subsequent sections include detailed instructions for the necessary maintenance and adjustments which should be carried out at regular intervals, together with notes on bulb changing, specifications of the vehicle, etc. These latter sections are for the owner who takes a personal interest in the maintenance of his vehicle and for other reference purposes.

On any correspondence appertaining to this vehicle the chassis number must be quoted. See page 35.

Important Information for the Owner



Safety hints

In the interests of road safety, your attention is drawn to the following important factors:

1. The condition of the vehicle. Adherence to the routine maintenance schedules in Section Six of this book is essential in providing safe, dependable and economical motoring, also to ensure that the vehicle conforms to the various safety regulations in force.
2. Recognition of traffic and road conditions. Always observe weather and road hazards and drive accordingly.
3. Importance of using the safety harness, even for the shortest of journeys.
4. Adjustment of seat to achieve a comfortable driving position with full control over the vehicle.
5. Frequent cleaning of windscreen, rear and side windows to achieve clear vision. Use a windscreen washer solvent in the screen washer reservoir, it will assist in cleaning the front and rear screen.
6. Maintenance of correct tyre pressures. These should be checked at least each month, or more frequently when high-speed touring or under cross-country conditions, even to the extent of a daily check.
7. Maintenance of all external lights in good working order and correct setting of headlamp beams.

Ignition and steering column lock and vehicle key numbers

8. For security reasons the key numbers are not stamped on the barrel locks. Loss of the key for the ignition and steering column lock completely immobilises the vehicle. For this reason and also because the keys are of a special design obtainable only from Rover British Leyland UK Limited, two ignition and steering column lock keys are supplied with each vehicle.

Owners are advised therefore in the strongest possible terms to take the following action:

(a) Immediately on receipt of the vehicle, record all the key numbers so that in case of loss, replacements can be obtained.
(b) Keep a spare ignition and steering column lock key away from the vehicle in a safe place, but where it is readily accessible.

9. The ignition and steering column lock is the latest advance in theft protection as it locks both steering and ignition. Properly used it greatly reduces the hazard of theft. When leaving the vehicle, remember to remove the steering column lock key, lock the doors and tailgate.

Contents

Driving Controls and Instruments

1

IN THE DRIVING SEAT

Paragraph numbers refer to the items illustrated, where applicable.

Front seat adjustment

1. Special safety type front seats are fitted having the safety harness secured to anchorage points on the seat. Fore and aft movement of the front seats is controlled by lifting the locking bar at the front of the seat cushion.
2. To allow easy access to the rear seat, the backrests can be tilted forwards by lifting the lever on either the inboard or outboard side of the seat.

The seats will automatically move forward on runners to provide the maximum amount of space.

Provision is made in the seat backs for the fitting of head restraints. Option pack.

Rear seat

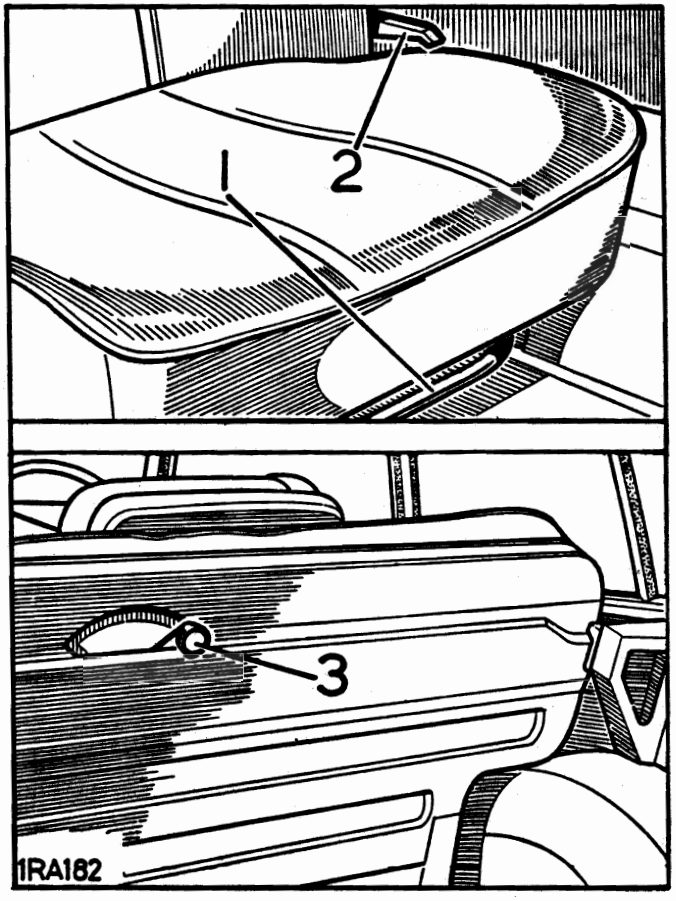
3. The bench type rear seat can accommodate three people comfortably. The backrest and seat can be folded forward to provide an added loading area in the rear compartment. It is secured in the normally upright position by means of 'catches' positioned at each end of the backrest. The catches are released by a lever positioned on the rear of the backrest.

Slide the lever to the left to release the backrest.

Rear view mirror

4. The interior rear view mirror stem is designed to 'break out' of its spring-loaded seating if impacted. The mirror lens surround is of pliant material and the metal parts have a non-reflective black finish.

The required rear view is obtained by moving the mirror frame about its swivel; lens deflection for anti-dazzle night driving is obtained by moving the two-position spring-loaded lever, protruding from the base of the mirror.



Handbrake

1. To release, pull the lever slightly back, depress the release button and push the lever down. The brakes are applied by pulling the lever back.

Steering

2. The steering will be found to be light in operation requiring only 4.75 turns of the wheel from lock to lock.

Power assisted steering is available as optional equipment.

Pedals

3. 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 is connected to the carburetters by a nylon cable.

To avoid needless wear of the clutch withdrawal mechanism, do not rest the foot on the clutch pedal while driving.

Main gear lever

4. The main gear lever is used in the normal way and will engage the five gears within the range selected by the transfer lever.

Gear positions are clearly marked on the knob. To engage reverse, pull the gear lever to the right, against spring pressure. All forward gears are provided with synchromesh.

Transfer gear lever

5. The transfer gear lever is used to select the high or low range of gears; it also has a neutral (mid-way) position.

The gear lever has three positions:

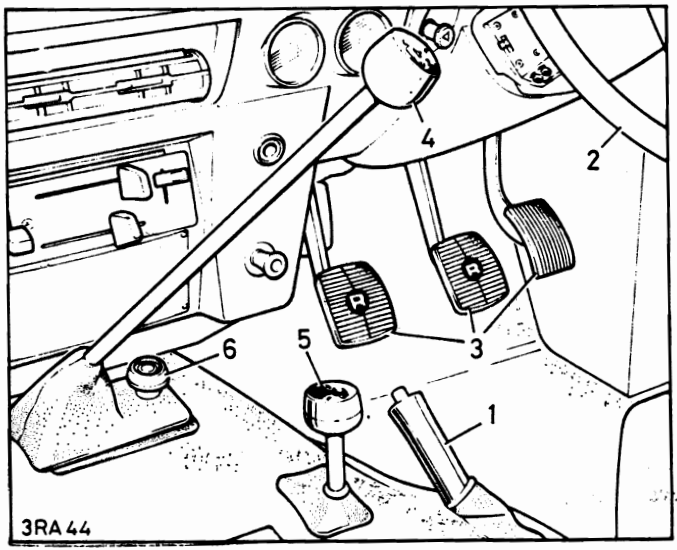
(a) High range—fully rearward. In this position, the main gear lever will select the gear ratios giving normal road speeds.

(b) 'Neutral'—midway position. Used in conjunction with power-take-off equipment.

(c) Low range—fully forward. When in this position, the low range of gears will be selected by the main gear lever.

Gearbox differential lock switch

6. The Range Rover has permanent four-wheel drive and a differential fitted in the transfer gearbox which allows a high degree of mobility in off road use.



MAIN DRIVING CONTROLS

Upon encountering conditions where traction to the road wheels becomes lost or it is obvious that traction will be lost a short distance ahead the differential can be locked by means of the differential lock switch. This ensures that all road wheels obtain the maximum amount of grip.

The switch is floor mounted, adjacent to and on the right-hand side of the main gear lever.

7. Pull switch up to engage differential lock, warning light in facia panel will be illuminated.

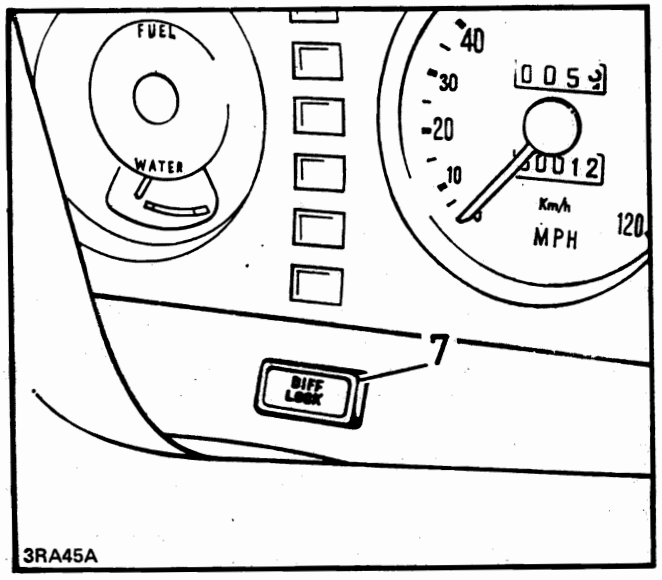
Switch pushed down: Differential unlocked, warning light extinguished.

The differential lock switch can be engaged or disengaged at any time the vehicle is in motion, providing that the engine is running.

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 commences.

NOTE. To avoid unnecessary wear and possible damage to the transmission and final drive, it is important that wide throttle openings are not used when the vehicle is operating in 1st and 2nd gear low range with the differential locked. A return to the unlocked position must be made as soon as traction is regained.

The differential lock switch need only be operated when traction is lost at one or more road wheels when exceptionally adverse cross-country conditions are encountered.



Gear changing procedure

8. The Range Rover gearbox may be regarded as having 10 gear ratios, that is eight forward speeds and two reverse.

For convenience in use these gears are evenly divided into two groups, termed 'Low' range and 'High' range.

'Low' range consists of four low forward gears, plus a low reverse gear.

'High' range consists of four normal gear ratios, plus a normal reverse gear.

The two ranges may be used progressively when changing up, if conditions demand.

Use of gear ranges

9. As an example of how full progressive range of the gearbox may be used, consider a vehicle which is heavily laden or towing a heavy trailer and which is required to pull away from a standing start up a steep gradient. With the transfer gear in 'low' range position, the vehicle will pull away in first gear and the gear changes for the first four gears can be made in the normal way with the main gear lever. When road conditions are suitable for high gear range they may be brought into operation without stopping the vehicle as follows:

Depress the clutch pedal. Return the main gear lever to the neutral position. Move the transfer gear lever to the neutral position. Release the clutch momentarily. Depress the clutch and move the transfer lever in 'high' position. Select second or third gear position, depending on road conditions, and release the clutch. Continue to change up in the normal way.

This operation can be carried out smoothly and quickly after a little practice. By making use of the full range of the gearbox in this manner, the clutch life will not be shortened by having to compensate for the selection of an unsuitable gear ratio.

Transfer gear changing

10. Changing from high to low, lever fully rearward to lever fully forward, 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 let in the clutch momentarily; then return the main gear lever to neutral and try the transfer control again.

SECONDARY DRIVING CONTROLS

Ignition and steering column lock switch

1 The switch has four positions. Use largest key.

(a) Key horizontal at '0' position. Electrical switch off. Steering column lock will be engaged during commencement of key removal. Turn steering wheel until locking plunger clicks into position. If there is difficulty in turning the key after replacement, release load on steering column lock by slightly moving the steering wheel to and fro.

Note: To prevent the steering column lock engaging it is most important that before the vehicle is moved in any way, i.e. for towing or coasting purposes, the ignition key must be inserted in the lock and turned to either the 'I' or 'II' position. If, due to an accident or electrical fault it is not considered safe to turn the key, the battery must first be disconnected.

(b) Turn right to position 'I'. Accessories can be used, that is, radio if fitted.

(c) Turn to position 'II'. Ignition and all accessories on.

(d) Continue to turn to right against spring pressure to position 'III'. Starter will operate.

(e) Should the engine fail to start at the first attempt or has stalled, it is necessary to turn the key back to the 'I' position. The operating sequence has been designed to prevent accidental locking. The key must be depressed in the 'I' position before it can be turned to the lock position '0'. The key can only be withdrawn or inserted in the lock '0' position.

Warning. If for any reason the (ignition) engine is switched off while the vehicle is in motion, **do not** attempt under any circumstances to depress, or turn the key into the lock '0' position, as this is part of the locking sequence for the steering.

Main light switch

2. The main light switch has three positions:

(a) Switch in upright position: all lamps off.

(b) Switch in centre position: side lamps on.

(c) Switch in down position: side and headlamps on.

Headlamp dipper switch, combining direction indicators, horn and headlamp flasher

3. The switch has six positions:

(a) Switch in central position: dipped headlamps.

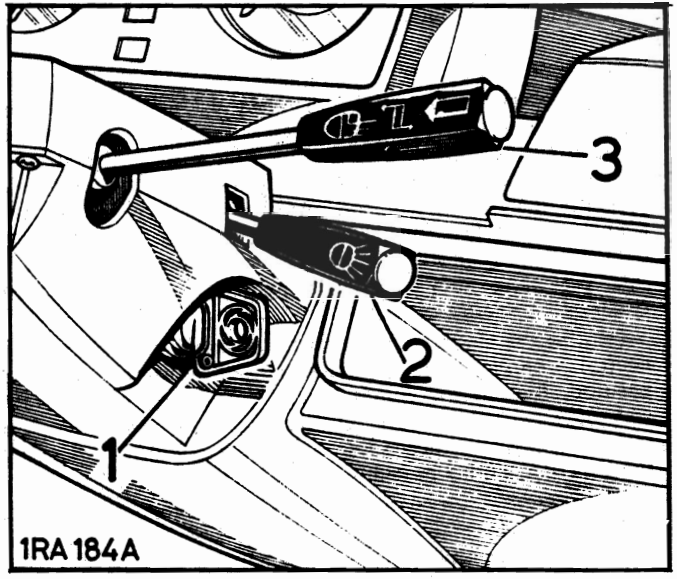
(b) Push switch fully forward: main beam.

(c) Lift fully upwards: headlamp flash. The headlamps can be flashed at any time, irrespective of other switch positions.

(d) Press dipper switch knob inwards to operate horn.

(e) Move switch anti-clockwise to indicate a left-hand turn.

(f) Move switch clockwise to indicate a right-hand turn.



Panel and instruments light switch

1. The panel and instruments light switch is operative only with the main light switch at 'side' or 'head' position.

Interior light switch

2. The interior light switch, which is immediately adjacent to the panel light switch, controls the centrally-mounted roof lamp, which will also be illuminated when either front door is opened.

Auxiliary driving/fog lamp switch

3. The switch has three positions, and can be operated with or without the ignition on.

(a) Switch in upright position: Auxiliary lamps off.
(b) Switch in central position: Single fog lamp only, left-hand; operative only with the headlamps on.
(c) Switch in down position: Both fog and long-range driving lamps; operative only with either side or headlamps on.

Windscreen wiper switch and screen wash

4. The windscreen wiper switch has four positions, and is only operative when the ignition is switched on.

(a) Switch in upper position: wipers off.
(b) Switch in central position: slow-speed wiper.
(c) Switch in lower position: fast-speed wiper.
(d) Lift fully upwards, 'flick-wipe' position: wipers will operate at slow speed until switch is released.

To wash windscreen, press wiper switch knob and hold until sufficient water is on windscreen. This can be done with wiper switch on or off.

For rear screen wiper and washer switch, see following page.

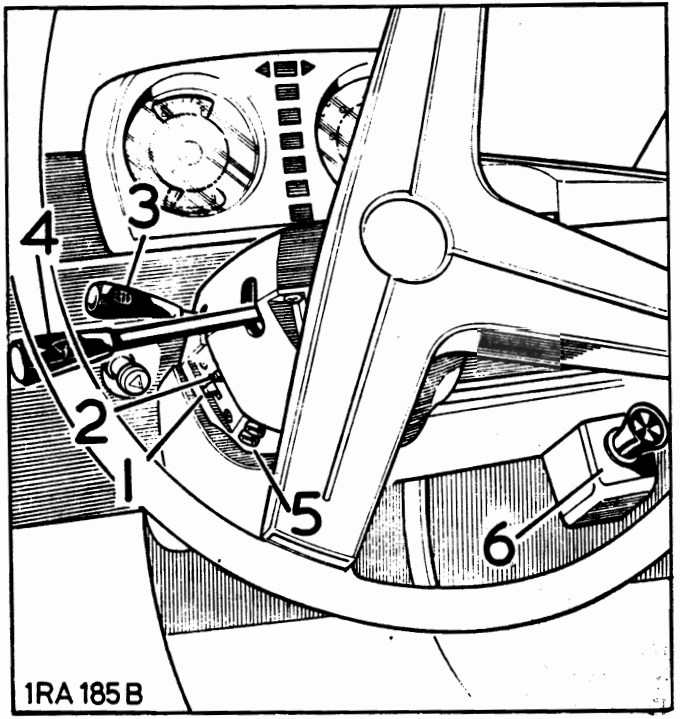
Inspection lamp sockets

5. The sockets can be used either for a lead lamp or a trickle battery charger. The black socket is earthed.

Cold start control

6. The cold start control has two functions:

(a) Pulled out approximately 14 to 16 mm (0.562 to 0.625 in.) increases the engine speed without mixture alteration.
(b) During the second stage of the movement the mixture is progressively enriched for cold starting. To ensure easy starting the control should initially be pulled fully out, summer and winter. After the engine has started return the control to the off position as soon as possible consistent with even running.
(c) By turning the knob slightly, the control can be locked in any position.



SECONDARY DRIVING CONTROLS

Rear screen wiper and washer switch

7. The rear screen wiper/washer switch has three positions and is only operative when the ignition is switched on.

(a) Push switch to mid-way position to operate the rear screen wiper.

(b) To wash the rear screen, push switch to lower position and hold until sufficient water is on the screen. The switch is spring loaded and will return to the mid-way position when released.

Important: Ensure that rear screen wiper is in the parked (off) position before raising the upper tailgate, otherwise damage may occur to the wiper arm and motor.

Cigar lighter

8. Operate by pressing the knob in until it clicks into position. After a few seconds it will eject to its original position when it can be withdrawn for use. When the side lights are on the socket surround is illuminated to facilitate location of the lighter in the dark.

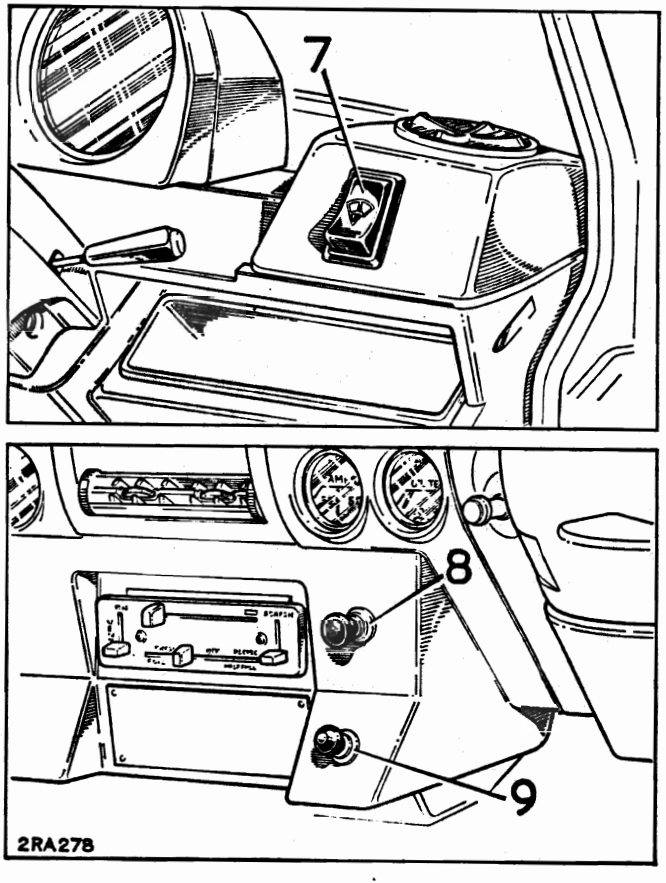
Heated rear screen, as applicable

9. Pull out the heated rear screen switch to operate the element on the rear screen. The switch knob will be illuminated acting as a reminder to the driver that the switch is in use. 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.



Ignition warning light

1. The red ignition warning light marked 'IGN' should glow when the ignition is switched on.

Brake warning light

2. The red warning light marked 'BRAKE' is most important and is arranged to warn you if there is a fluid leakage from either the front or rear braking system. The warning light will come on when brakes are applied and go out when pedal pressure is released if leakage occurs.

The brake warning light is also arranged to come on when the handbrake is applied.

On models for certain overseas territories the brake warning light will also operate when a loss of vacuum occurs in the brake servo system.

Oil pressure warning light

3. The red warning light marked 'OIL' must glow when the ignition is switched on. The ignition and oil pressure 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.

Warning lights

4. Brake, ignition 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. If any of the above lights come on during normal running or braking, the vehicle should be stopped immediately and the cause investigated. This is of special importance in the case of the brake and oil warning lights. Before a fault is suspected in the brake hydraulic system, it should be ascertained that the handbrake lever is in the fully 'off' position.

Note. The ignition warning light is connected in series with the alternator field circuit. Bulb failure would prevent the alternator charging except at very high engine speeds, 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.

Hazard warning light

5. When the hazard warning light switch is pulled out, all four flasher lights operate simultaneously. The red warning light in the switch and both flasher arrows in the instrument panel 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.

Main beam warning light

6. The blue light marked 'BEAM' 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.

Direction indicator arrows

7. The appropriate arrow flashes in conjunction with the selected set of indicator lights. In addition the flasher unit is audible while the lights are flashing.

Should either a front or rear indicator bulb fail, the warning light on the side affected will remain on and the flasher unit will not be heard.

WARNING LIGHTS

Cold start warning light

8. The appearance of the amber warning light marked 'CHOKE' will remind you that the cold start control is still out and should be returned to the 'off' position as soon as possible, consistent with even running.

However, the warning light will not be illuminated at the fast idle position; that is, the control out approximately 14 to 16 mm (0.562 to 0.625 in.).

Fuel level warning light

9. The green 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.

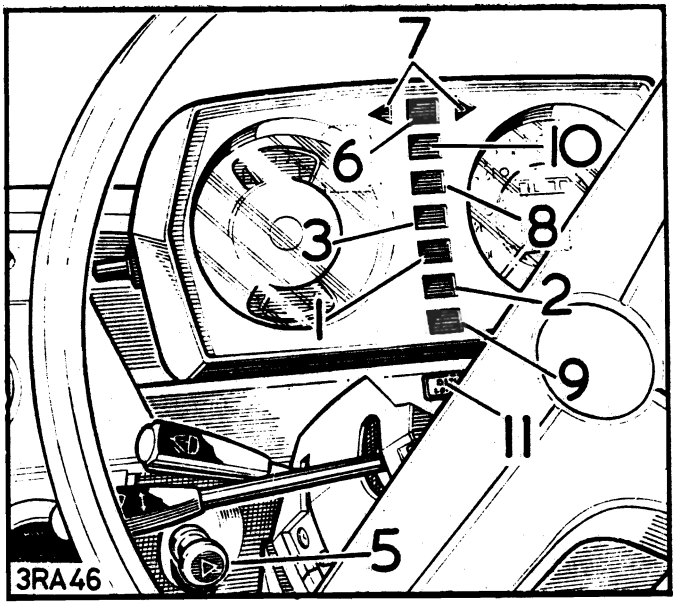
Intermittent flashing may occur when cornering, etc. before the fuel level drops below two gallons.

Trailer warning light

10. The trailer warning light is only operative when a trailer is connected to the vehicle via a seven-pin socket (optional equipment). It will flash simultaneously 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.

Differential lock warning light

11. The orange warning light will be illuminated when the gear-box differential lock switch, located adjacent to the main gear lever, is operated. Use the differential lock only when traction to the road wheels becomes lost, i.e. under exceptional adverse cross-country conditions. A return to the off position should be made as soon as conditions permit. See pages 9 and 10 for further details.



Speedometer

1. The speedometer incorporates total and trip mileage indicators.

Speedometer trip setting

2. Turn trip back to zero by anti-clockwise rotation of the small black knob on the instrument panel end finisher.

Fuel level indicator

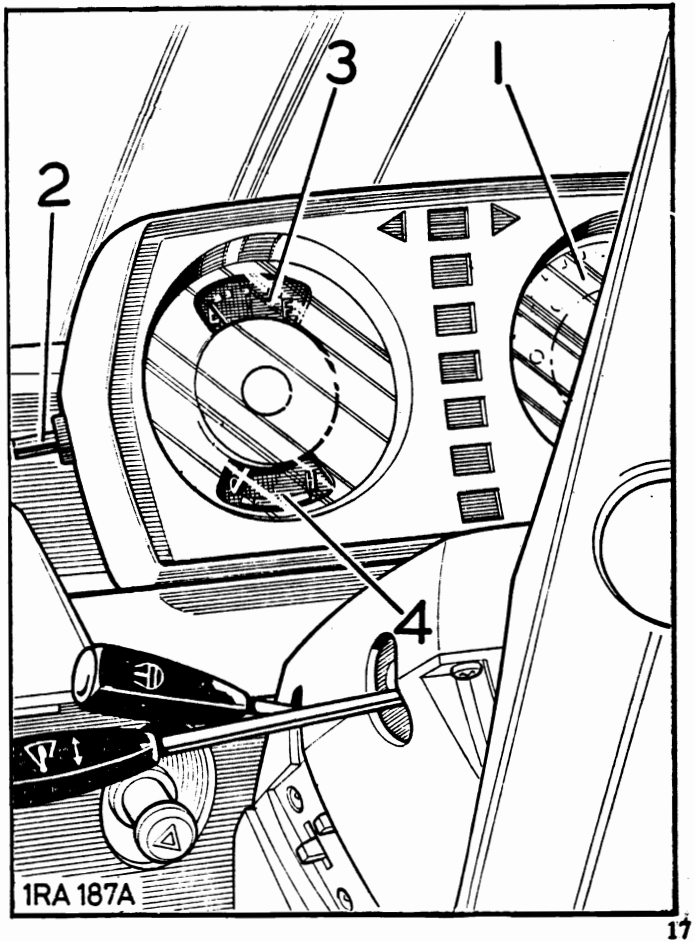
3. The fuel level indicator shows the contents of the tank: the total capacity being 81,5 litres; 18 Imperial gallons; 21.5 US gallons.

Coolant temperature indicator

4. Under normal running conditions the temperature indicator needle should register in the black band. Should the needle travel to the red band during normal running, the vehicle should be stopped and the cause investigated.

Clock

5. The clock, mounted on the heater console, is an electrically-wound type. The hands may be set by means of the black knob in the centre of the face. Push in to operate. For clock adjustment see page 113.



INSTRUMENTS

Oil pressure gauge

6. Under normal running the oil pressure indicator should register 2,1 to 2,8 Kg/cm² (30 to 40 lb/sq in). The needle may drop below this when the engine is idling but providing the oil pressure increases to approximately 2,1 kg/cm² (30lb/sq in.) immediately the engine speed is increased the oil pressure can be considered satisfactory.

Should the needle drop to the zero position during normal running the vehicle should be stopped immediately and the cause investigated.

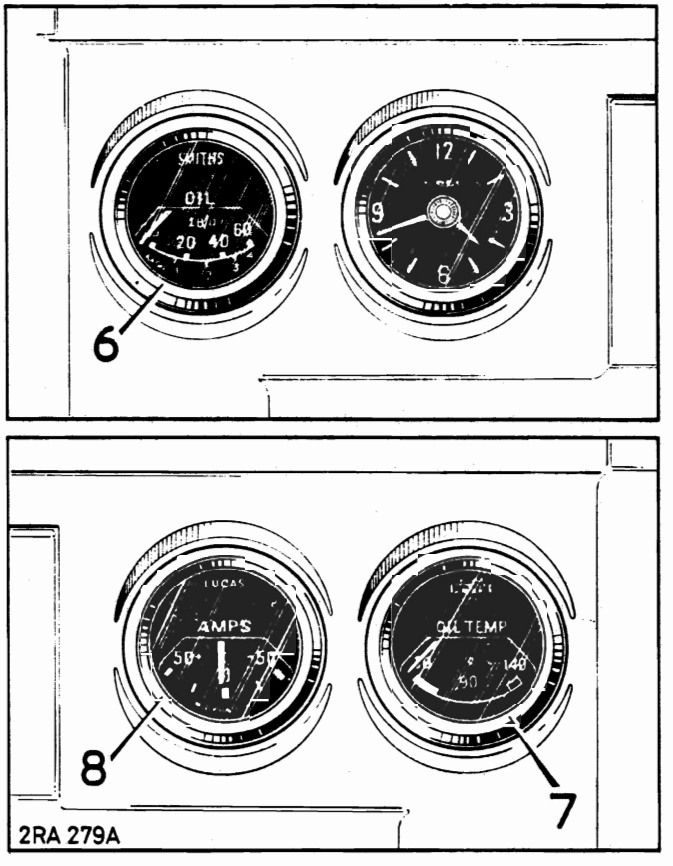
Oil temperature gauge

7. The oil temperature gauge gives a continuous indication of the oil temperature.

The temperature should not exceed 120°C (248°F) under normal operating and climatic conditions, but may rise to 130°C (266°F) under arduous/tropical conditions. If temperatures above 130°C (266°F) are recorded for any length of time the cause should be investigated.

Ammeter

8. The ammeter indicates the charging and discharging rate of the battery. After starting the engine from cold the ammeter should show a high rate of charge this will progressively reduce and under normal running a slight balance charge only will be shown.



Heating and Ventilation

2

HEATING SYSTEM

Heating

The Range Rover has a combined fresh air and recirculating heating system which has been designed so that either system can be used separately.

The recirculating heater is normally used in heavy traffic conditions to avoid obnoxious fumes entering the vehicle, also for a rapid heat build up inside the vehicle under cold conditions.

The controls are operated with the following effect:

1. Main lever. This has six positions:
(a) 'OFF'. Air entry into vehicle completely cut off.
(b) For fresh air heating: move the lever to the left to the position marked 'RAM'. Air will enter the vehicle either through the face-level louvres, if required, or through the heater to the screen, or car or both, by ram action due to the forward movement of the vehicle.
(c) Further movement to the left to the position marked 'HALF', the blower will operate at low speed.
(d) Continue movement to the left to position marked 'FULL', the blower will operate at full speed.
The blower is normally used when the vehicle speed is too low to provide sufficient heating by ram action alone.
(e) To operate the recirculating heating system, move the lever across towards position marked 'RECIRC', when either half or full speed blower can be used.

2. The top lever for temperature control.
(a) Move in blue direction to decrease heat.
(b) Move in red direction to increase heat.
(c) Action is progressive between the two.

3. Vent—the left-hand lever, which has two positions:
(a) ON: This allows entry of cool air only from the two face-level louvres on the facia panel, and also the centre face-level louvre. The face-level louvres can be adjusted rotationally and progressively to regulate the direction of air flow to the passengers.
(b) OFF: This cuts entry of air completely from the face-level louvres.

4. Screen and car—the right-hand lever, which also has two positions:
(a) 'Screen': All air is directed to the windscreen through the demister vents, either hot or cold.
(b) 'Car': All air is directed to foot level, either hot or cold, although a certain amount will continue to flow through the demister vents.

Heater distribution flap

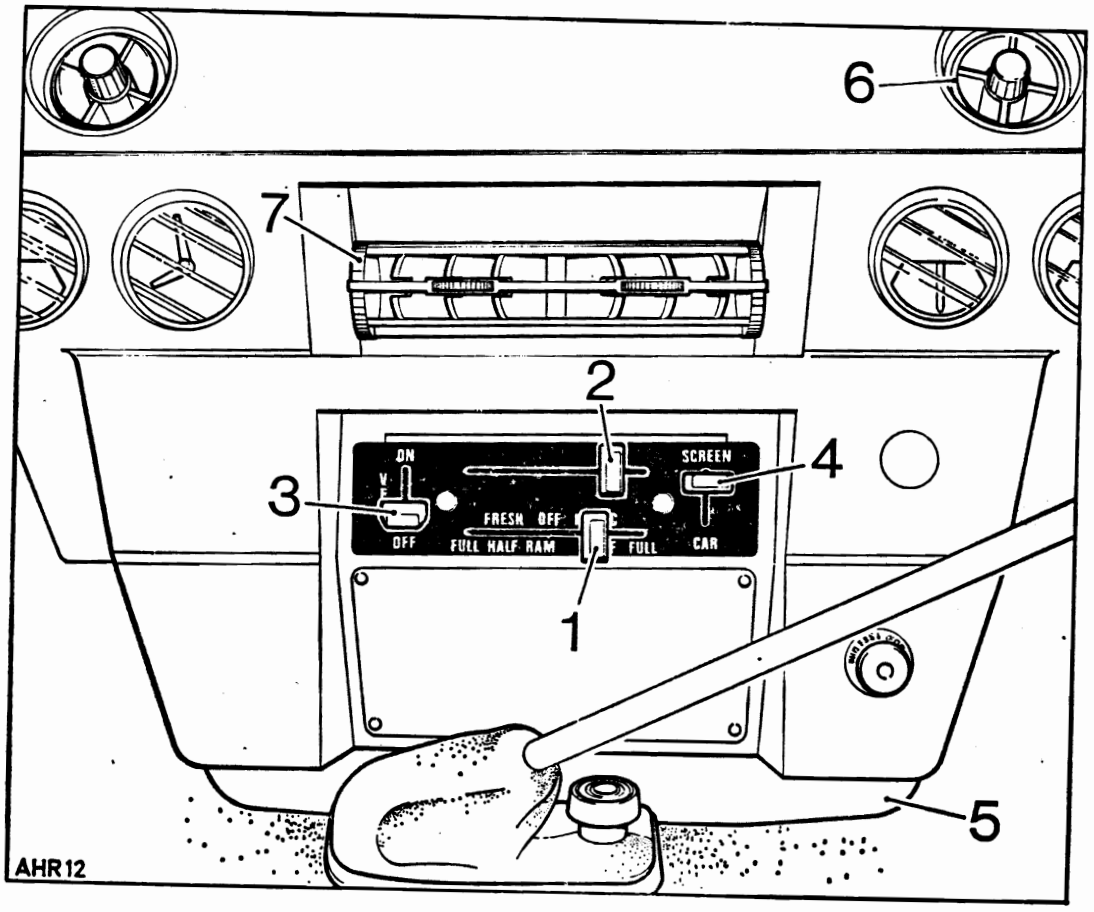
5. With the flap closed, the main heat supply will be to the front footwells and the demister. With the flap fully open, the main heat supply will be to the rear seat passengers. With the flap in the half-way position, heat supply will be divided between the footwells and demister, and the rear seat passengers.

Side face-level louvres

6. The two side face-level louvres blow only cool air; each have knurled knob in the centre, which can be rotated to regulate the amount of air. The louvre itself is adjustable, regulating the direction of air flow.

Centre face-level louvre

7. The centre face-level louvre also blows only cool air. Open the control and increase the air flow by rotating the unit upwards. Direction of air flow to driver and passenger can be controlled by operating the centre knurled adjusters.


6
7
2
ON
SCREEN
4
3
FRESH OFF
OFF
FULL HALF RAM
FULL
CAR
1
5
AHR12

VENTILATION

Door ventilator windows

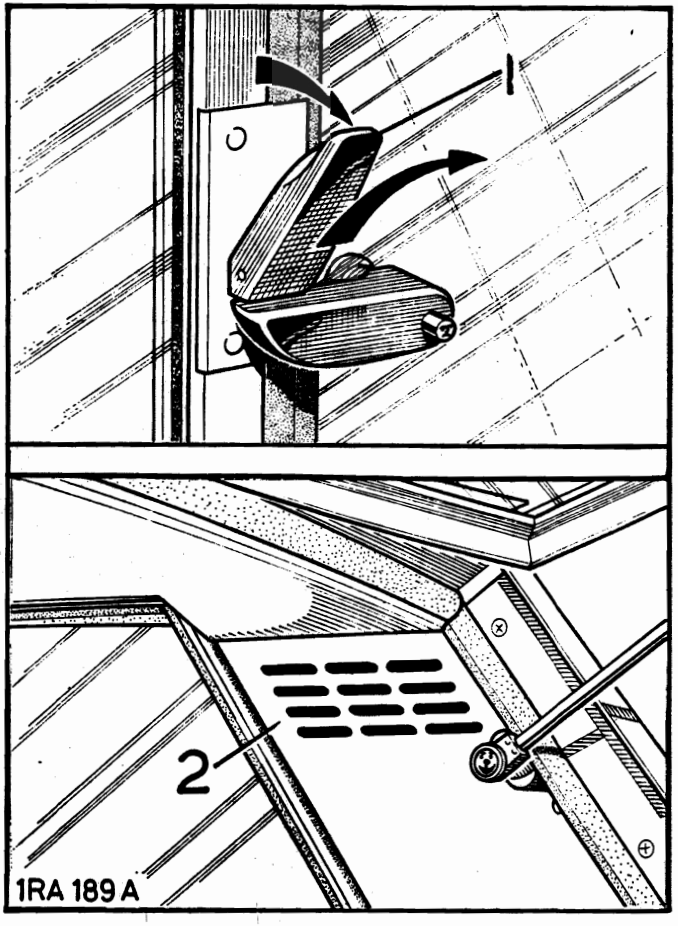
1. Controlled by a flush fitting safety type catch; push in the centre button to release, and turn the catch towards the front of the vehicle. The window can then be opened to increase the air flow through the vehicle.

Through-flow ventilation

2. A through-flow ventilation system is achieved in the Range Rover by means of one-way air extraction vents incorporated in both rear quarter panels. Each vent is automatically opened or closed progressively increasing or decreasing the amount of ventilation to suit interior conditions.

Air flows round and through the interior air ventilators, and is dispensed down the inner section of the quarter panel and out through the lower exterior vent.

The system gives controlled ventilation throughout the vehicle, and the continual flow of air is also an important safety factor, as it prevents the interior becoming stuffy, and minimises any tendency to drowsiness on the part of the driver.



Safety Harness and Body Fittings

3

SAFETY HARNESS

The front seat safety harness complies with BS 3254 : 1960 and is secured to anchorage points, complying with BS AU/140: 1967, provided on the special safety type front seats.

The harness comprises a combined shoulder and lap strap with an engagement tongue, and a one handed type engagement/release buckle on a short stalk at the inboard hip position of the seat.

Belt adjustment is made as required at the buckle on the shoulder strap.

Day-to-day use of the safety harness

To maintain the maximum designed protection from the safety harness it is essential that it is properly fitted and adjusted. This can only be achieved by adhering to the following simple rules.

With the occupant in the front seat, fasten the safety harness as follows:

1. Shows layout of safety harness and identifies the individual components.

   A—Harness stowage clip.

   B—Adjustment buckle.

   C—Shoulder strap.

   D—Engagement tongue.

   E—Short strap with one handed engagement/release buckle.

   F—Lap strap.

2. Detach the engagement tongue D from the stowage clip A on the shoulder strap C.

3. Pass the outboard arm through the harness and position the shoulder strap and lap strap across the body. Then lengthen the harness by holding the buckle B at right angles to strap and pulling lap strap F in direction of arrow.

4. Push the engagement tongue D into the one handed type engagement/release buckle at the inboard hip position. A positive 'click' ensures that the harness is safely locked.

5. Adjust the harness length as necessary by pulling the free end of the lap strap F. Straps should be comfortably tight, just enough to allow the hand to be passed between shoulder strap and body.

   The lap portion should be worn low so that it rests on the bony part of the hip. The lap portion can usually be worn tighter than the shoulder portion without discomfort. Slack in the lap strap should be pulled through the slot in the engagement tongue and the shoulder strap adjusted as above.

6. To release the harness, press, where so marked, on the release buckle E at the inboard hip position, and the engagement tongue D will detach from the housing.

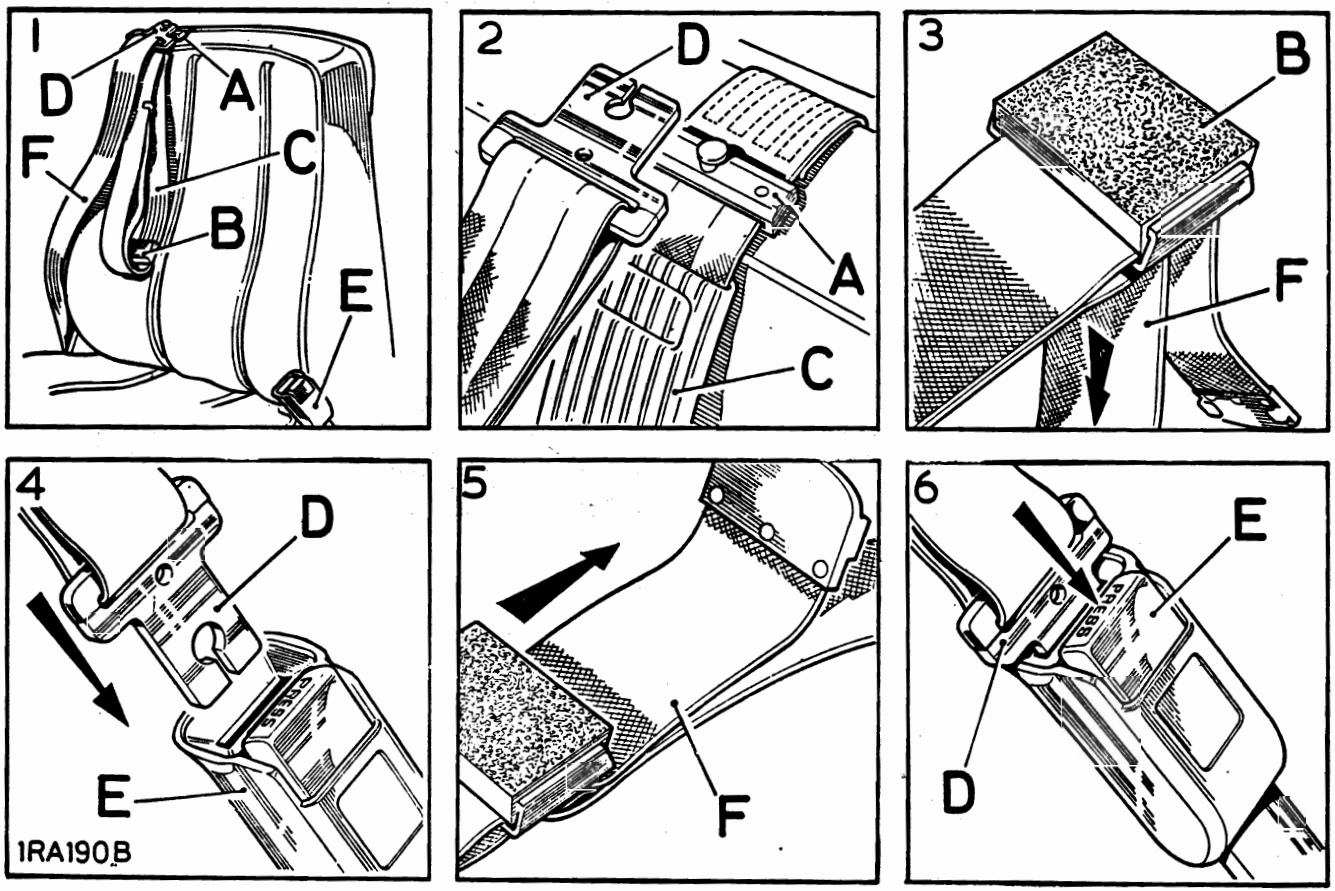
Safety harnesses which have been used in an accident or have been frayed or cut must be replaced with a new harness complete.

To avoid soiling and twisting the safety harness when it is not in use, the engagement tongue should be secured to the harness stowage clip.

The harness may be washed in hand-hot water with soap or household detergent. Do not use any other cleaning fluid. Allow to dry naturally. Do not apply heat.

Rear seat harness

Rear seat harness can be supplied as optional equipment. Details can be obtained from your Rover Distributor or Dealer.


1
D
A
F
C
B
E
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D
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C
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F
4
D
E
1RA190B
5
F
6
E
D

LOCKS AND BODY FITTINGS

Doors and lock controls

1. The front doors are extra wide for ease of entry and exit for rear seat passengers. The doors are locked from the outside by the ignition key.

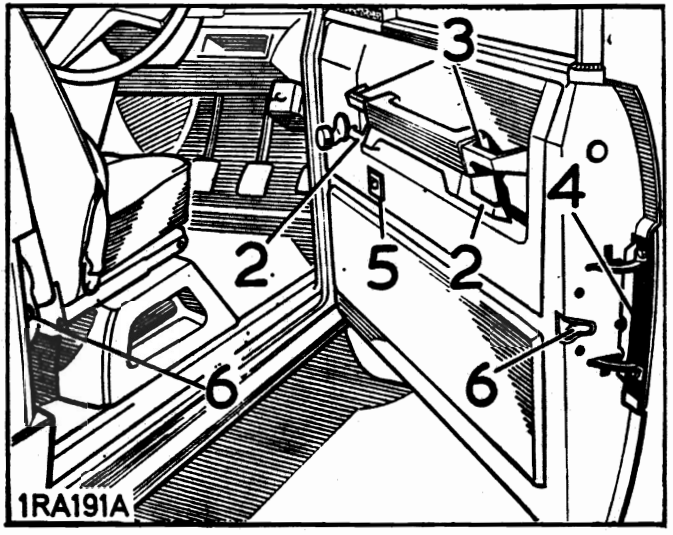
2. Both doors can be opened from inside by front or rear passengers via twin release handles. Both handles operate independently; pull to release.

3. The door pull handles are located immediately above the door release handles.

4. The exterior door handle is operated by pulling outwards.

5. As a safety precaution an interior catch is provided on both doors to prevent the doors from being opened accidentally from the inside. The catch has two positions:
(a) Fully forward: door locked.
(b) Fully rearward: door unlocked.

6. Both doors are fitted with an anti-burst device to prevent them flying open in the event of an accident.



Bonnet lock control

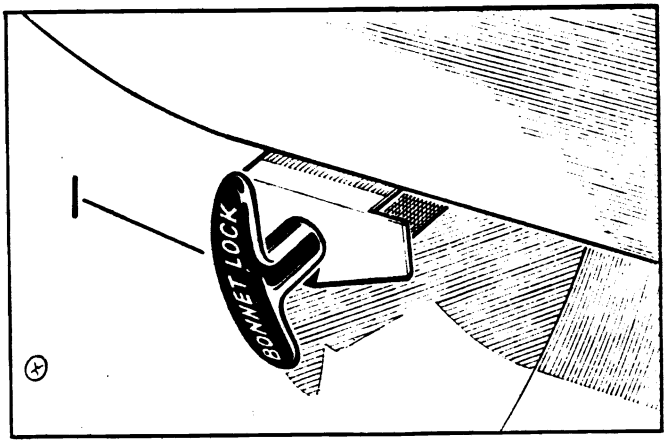
1. To open the bonnet, pull the control knob, located below the glove box, passenger side. This disengages the locking plate and allows the bonnet to spring open sufficiently to insert the fingers.

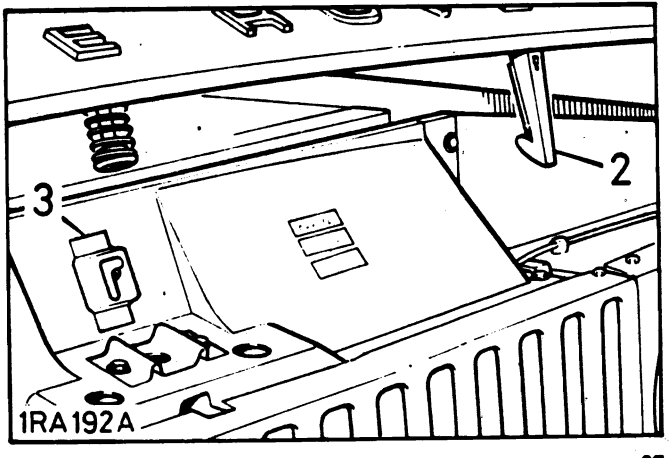
2. The bonnet has a safety catch which must also be released by lifting the bonnet slightly and pulling forward the catch at the front right-hand side of the bonnet.

3. In the fully open position the bonnet can be supported by the prop rod, which should be engaged in the slotted hole in the top of the radiator grille.

4. To close the bonnet, replace the prop rod, lower bonnet to about 304 mm (12 inches) above the grille and allow to drop into position.

5. If it is necessary to push down on the bonnet, do this with the palms of both hands at the front edge.





LOCKS AND BODY FITTINGS

Sliding side windows

1. The large rear side windows are of the sliding type, the forward section having five open positions for varying degrees of ventilation. Each sliding window is controlled by a simply-operated catch.

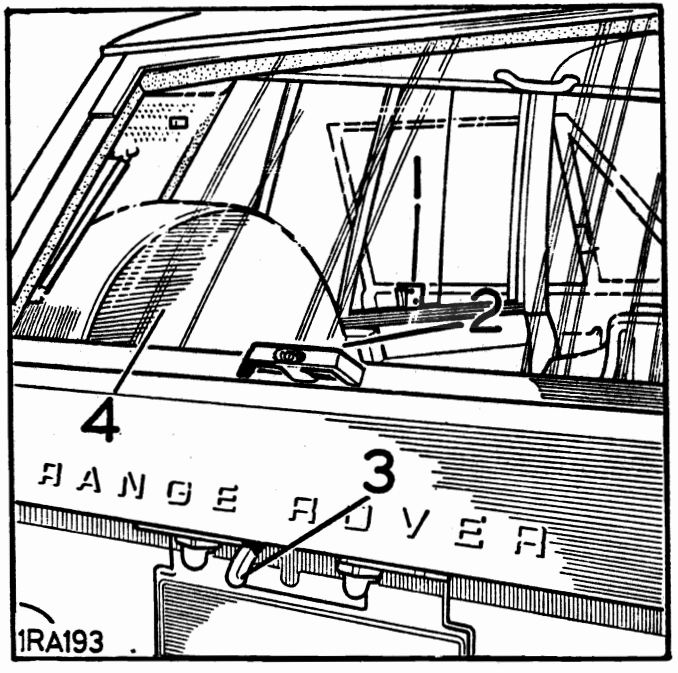
Tailgates

The Range Rover provides full width upper and lower tailgates, allowing maximum space for loading, etc.

2. The upper tailgate, which must be opened before the lower tailgate can be lowered, is released by depressing the locking button in the centre of the handle. The tailgate can then be raised to its fully elevated position, where it is supported by means of telescopic rods. The tailgate is locked by using the square-headed key.

Important: Ensure that the rear screen wiper is in the parked (off) position before raising the upper tailgate, otherwise damage may occur to the wiper arm and motor.

3. The lower tailgate is an all-steel construction for greater strength. It is supported in the lowered position by means of folding stays and has a single centre locking handle above the hinged number plate plinth. The handle has three positions:
(a) Handle in fully left position: tailgate locked.
(b) Handle in centre position: tailgate catch.
(c) Handle in fully right position: tailgate released.



Spare wheel

4. The spare wheel is mounted in the interior of the vehicle, positioned at the left-hand rear side. A fabric wheel cover is fitted over the wheel to prevent soiling of articles in the vehicle.

Fuel filler

1. A lockable fuel filler cap is located on the rear right hand wing and is locked with the glove box key.

When the cap is unlocked it will automatically hinge open.

Glovebox

2. A lockable glovebox is provided on the passenger's side and can be opened by pulling the release handle rearwards. Lock with the square-headed key.

Facia panel

3. The facia panel has a 'grained' finish, with a centrally-placed radio speaker grille, a tray with a non-slip rubber mat is provided on the passenger's side.

4. A map pocket, which alternatively can be used to accommodate a radio, is located on the driver's side adjacent to the steering column.

Body care

5. It is always preferable to clean the bodywork and exterior trim with water and sponge, using plenty of water. Dry with a chamois leather, polish occasionally using any good brand of wax car polish.

The use of salt on the roads during frosty weather, sometimes in quite strong concentrations, is widely practised. Due to its highly corrosive nature, salt deposited should be washed off as soon as possible by thorough underwashing of the vehicle with a hose.

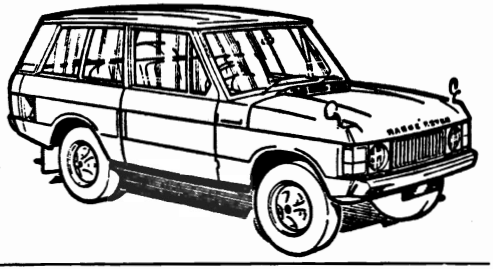
It is most important that detergents are not used when cleaning seats, etc. Use a damp cloth or soft brush with a little mild soap.

Nylon corded seat trim can be supplied as optional equipment. Clean off surface dirt and dust using a soft brush. Wash with warm water and mild soap. Allow to dry naturally.

Vinyl covered rear quarter panels

Wash the vinyl surface over with warm soapy water (use soap flakes or mild tablet soap). If dirt is ingrained the use of a soft nail brush will help. Rinse off with clean cold water ensuring that all soap is removed. During normal cleaning of the car the vinyl will not be affected by mild detergents such as are used in Automobile Car Washes. Avoid the use of wax polish, creams, solvents or strong detergents. Under no circumstances should White Spirit or Petrol be used to remove oil or grease marks from the vinyl surface.

Running Requirements and Recommended Lubricants



4

RUNNING REQUIREMENTS

Fully illustrated details of all maintenance required will be found in Section 6 of this manual, but you should note the following:

Running-in period

1. Progressive running-in of your new Range Rover is important and has a direct bearing on durability 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 80 to 95 kph (50 to 60 mph) on a light throttle and this may be progressively increased over the first 2.500 km (1,500 miles).

Coolant

2. The water level should be checked periodically.

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.

When the engine is cool, remove the expansion tank filler cap by first turning it anti-clockwise a quarter of a turn, and allow all pressure to escape, then turn it further in the same direction to lift off. When replacing the filler cap it is important that it is tightened down fully, not just to the first stop. Failure to tighten the filler cap properly may result in water loss, with possible damage to the engine through overheating.

With the engine cold the correct coolant level should be up to the 'Water Level' plate, located inside the expansion tank just below the filler neck.

Never top-up with plain water, always use a solution of water and the correct type of anti-freeze or water and inhibitor. See lubrication chart, page 34.

Do not forget to keep the screenwasher bottle filled with water; add 'Isopropyl Alcohol' or methylated spirits in the winter to prevent freezing.

Frost precautions

3. As it is impracticable to drain the cooling system fully due to water being retained in the heating system, a special anti-freeze mixture is used in the Range Rover during the winter and summer months. Anti-freeze mixture is also used to prevent corrosion of the aluminium alloy engine parts. It is most important therefore if the cooling system is drained or topped up at any time either winter or summer, to refill with a solution of water and the correct type of anti-freeze or water and inhibitor, where anti-frost precautions are not necessary, otherwise damage to the engine will result.

Battery acid level

4. Make sure that the battery acid level is above the top of the separators in each cell. Do not over-fill.

Tyres

5. The 205R x 16 radial-ply tyres used on Range Rover models have been specially selected to give the best all-round performance.

Warning: Many off-road types of tyre have a maximum speed capability below that of the Range Rover therefore when tyre replacements are required radial ply tyres of an approved type must be used. Under no circumstances should cross-ply tyres be used as replacements. Consult your local Rover Distributor or Dealer for guidance if in any doubt concerning the type of tyre required.

Tyre pressures

6. These 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.

All speeds and loads up to 226 kg (500 lbs):	Front	Rear
	1,8 kg/cm²	1,8 kg/cm²
	(25 lb/sq in.)	(25 lb/sq in.)
	1.72 bars	1.72 bars
All speeds and loads above 226 kg (500 lbs):	Front	Rear
	1,8 kg/cm²	2,5 kg/cm²
	(25 lb/sq in.)	(35 lb/sq in.)
	1.72 bars	2.4 bars

These pressures may be increased for rough off-road usage where the risk of tyre cutting or penetration may be increased. Pressures may also be increased for high speed motoring near the vehicles maximum speed. Any such increase in pressures may be up to 0,49 kg/cm² (7 lb/sq in.) 0,49 bars to 0,56 kg/cm² (8 lb/sq in.) 0,56 bars, but with an absolute maximum pressure of 2,9 kg/cm² (42 lb/sq in.) 2,94 bars. For off-road use in soft conditions where a maximum speed of 64 kph (40 mph) is used pressures may be reduced to obtain maximum traction as follows:

Loads up to 226 kg (500 lbs):	Front	Rear
	1,1 kg/cm²	1,1 kg/cm²
	(15 lb/sq in.)	(15 lb/sq in.)
	1,03 bars	1,03 bars
Loads above 226 kg (500 lbs):	Front	Rear
	1,1 kg/cm²	1,8 kg/cm²
	(15 lb/sq in.)	(25 lb/sq in.)
	1,03 bars	1,72 bars

Normal operating pressures should be restored as soon as reasonable road conditions or hard ground is reached.

After any usage off the road, tyres and wheels should be inspected for damage particularly if high cruising speeds are subsequently to be used.

Fuel recommendations

1. The Range Rover engine has been designed to run on 91-93 octane fuels. No advantage will be gained by the use of higher octane fuels.

Brakes

2. Never coast downhill with the engine switched off as the brake servo will not be operative. The brakes will however function through the hydraulic system when the brake pedal is depressed, but more foot pressure will be required.

Tools

3. The jack, together with a tool roll, will be found attached to the rear off-side body panel. Starting and jacking handles are also provided.

IMPORTANT POINTS TO REMEMBER

1. **Read the Rover Service Guide, Section Five of this book, which contains important information for the Owner.**
2. **If spark plug replacements are required, use only the correct type as specified in the Data Section of this book. However, should emergency compel, the nearest alternative fuel or spark plugs may be used temporarily, subject to a speed restriction of 96 kph (60 mph).**
3. **Maintain correct tyre pressures.**
4. **Let a Rover Distributor or Dealer service your Range Rover and use only genuine Rover parts.**

Recommended lubricants, fuel and fluids

1. Use only the recommended grades of oil as set out below.

The oil level dipstick will be found on the left-hand side of the engine and the oil filler cap is screwed into the right-hand rocker cover at the front of the engine.

2. Oil consumption is likely to improve during the first 6.000 km (4.000 miles) of the vehicle's life as the piston rings, etc. bed in.

These recommendations apply to temperate climates where operational temperatures may vary between —10°C (14°F) and 32°C (90°F).

Lubricants marked with an asterisk (*) are multigrade oils suitable for all temperature ranges.

COMPONENT	SAE	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	TEXACO	SHELL
Engine Main gearbox Transfer gearbox	20W	*BP Super Visco-Static 20–50	*Castrol GTX	Duckhams Q20–50 Motor Oil	Uniflo or Esso Motor Oil 20W	Mobiloil Super or Mobiloil Special 20W/50	Havoline Motor Oil 20W–50	*Shell Super Oil
Differentials Swivel pin housings Steering box	90EP	BP Gear Oil SAE 90 EP	Castrol Hypoy	Duckhams Hypoid 90	Esso Gear Oil GX 90	Mobilube GX 90	Multigear Lubricant EP 90	Spirax 90 EP
All ball joints Front and rear hubs Propeller shafts	—	BP Energrease L2	Castrol LM Grease	Duckhams LB 10 Grease	Esso Multipurpose Grease H	Mobilgrease MP or Mobilgrease Super	Marfak Allpurpose	Retinax A or Darina AX
Power steering fluid reservoir, as applicable	—	BP Autran B	Castrol TQF	Duckhams Q-Matic	Essoglide	Mobil ATF 210	Texamatic Type F	Shell Donax T7
FUEL AND FLUIDS Fuel	91 to 93 Research Octane Fuel, 2-star grade in the United Kingdom with standard ignition timing (5° ATDC dynamic at 600 revs/min) 85-91 Research Octane Fuel, with reset ignition timing (8° ATDC dynamic at 600 revs/min)							
Brakes and Clutch	Lockheed Brake and Clutch Fluid Specification current 329S and US Federal Standard 116							
Anti-freeze solution for cooling system	Bluecol AA coloured green for winter and summer use, or anti-freeze conforming to British Standard No. 3150 or Prestone or anti-freeze to MIL-E-5559 formulation.							
Inhibitor solution for cooling system	Marston Lubricants SQ36—Coolant inhibitor concentrate. For summer use only when frost precautions are not necessary							

Chassis serial number

1. The chassis serial number, together with the recommended maximum vehicle weights, will be found on the inside of the bonnet adjacent to the bonnet striker mechanism.

The chassis number is also stamped on the right-hand side of the chassis, adjacent to the front shock absorber.

Always quote the chassis number when writing to Rover British Leyland UK Limited or your Distributor and Dealer on any matter concerning your Range Rover.

Engine serial number

2. The engine serial number is stamped on a cast pad on the cylinder block between numbers 3 and 5 cylinders adjacent to the engine oil level dipstick.

Do not quote this number unless requested.

Rover Service Guide

5

SERVICE GUIDE

1. Rover British Leyland UK Limited sets high standards in the design specification and production of its vehicles and desires that these should give reliable and satisfactory performance.

It is therefore strongly recommended that owners and users of Rover vehicles should familiarise themselves with the following information which is issued for the specific purpose of helping them and which is set out under the following headings.

The new vehicle
Maintenance attention
General notes
Owner's Service Statement

The new vehicle

2. With every new vehicle special literature is provided and it is of importance that this should be made full use of. The literature consists of the following:

(i) Owner's Manual: This book, which gives general information about the vehicle, also incorporates notes on service, the Owner's Service Statement and full information on how to carry out the necessary maintenance.

(ii) Passport to Service which gives details of maintenance required and also 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 vehicle, the owner should immediately:

(i) Examine the Owner's Manual for advice on new features and as an aid to getting the best out of the vehicle.

(ii) Arrange with a Rover Distributor or Dealer to carry out regular maintenance attention.

Maintenance attention

3. Efficient maintenance is one of the biggest factors in ensuring continuing reliability and efficiency. For this reason detailed schedules have been prepared so that at the appropriate mileages owners may know what is required.

(i) The Pre-delivery Inspection is a very important first step in the work of preventative maintenance. The Dealer responsible for the sale of the vehicle will have completed the work involved. There is provision in the Passport to Service for certification that this work has been carried out.

(ii) The Free Service Inspection should be carried out by the Dealer responsible for the sale of the vehicle to the owner at or about 1.500 km (1,000 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 free service to be carried out by the Dealer responsible for the sale, it can, by prior arrangement with such Dealer, be carried out by any other Rover Distributor or Dealer.

(iii) The Maintenance Schedules are based upon intervals of 5.000 km (3,000 miles) or 3 months.
These Maintenance Schedules are not priced but guidance is given to Dealers upon the actual time required to carry these out.

GENERAL NOTES

Spare parts

4. It is not always realised by owners how important it is that when spare parts are required for repair or maintenance that these should be Rover supplied parts only, or parts supplied through sources approved by the Company. Rover Distributors and Dealers are obligated to supply only such parts.

Through other sources parts are often sold as being suitable for Rover vehicles, but frequently these are not made to the same standard or specification as the Company's parts and are therefore less likely to give the requisite performance.

Having regard to the regulations which exist in certain countries concerning safety related parts, owners should ensure that whenever such new parts are fitted to their vehicles they should obtain from the Dealer who has carried out the repairs assurance in writing that the parts concerned conform to the safety regulations (if any) currently in force.

Labour charges

5. The company does not issue detailed schedules of repair charges but guidance is given to Dealers on the normal times required for the majority of repair and maintenance operations (not to accidental damage to bodywork, etc.).

Over the last few years service labour costs have risen considerably and where a high standard of work is looked for, the higher price of labour charges is inevitable.

Owner's Service Statement (Warranty)

6. Rover British Leyland UK Limited issues under the heading of Owner's Service Statement an undertaking regarding its Service policy.

Home market: The Owner's Service Statement is supplied in the Literature Pack.

Export markets: The Warranty (Owner's Service Statement) should be obtained from the Distributor or Dealer at the time of purchase.

The following notes are given for guidance in the event of a claim being put forward:

(i) The vehicle or the part in respect of which a claim is made must be taken immediately to a Rover Distributor or Dealer. This should, wherever possible, be the Distributor or Dealer responsible for the sale of the vehicle to the owner.

(ii) The Distributor or Dealer will examine the parts or vehicle 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.

(iii) 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.

(iv) It will be noted that tyres and glass are expressly excluded. The manufacturers of those tyres which the Company fits as standard to its vehicles will always be prepared to consider any genuine claim.

(v) Where this has not already been done, it is recommended that owners should arrange with their Insurance Company to provide separate cover for the glass at the small extra cost involved.

Routine Maintenance and Adjustments

6

Emission control—where applicable

As air pollution from all sources is increasing, new and more stringent regulations are continually being introduced to limit the amount of harmful emissions from the internal combustion engine.

This requirement therefore determines the specification and type of equipment fitted to the vehicle and also the calibration requirements where applicable, for such equipment.

Owners should ensure that whenever new parts are fitted to their vehicles they obtain from the Distributor or Dealer who has carried out the repairs assurance in writing that the parts concerned conform to the safety and emission control regulations (if any) currently in force.

Range Rover models supplied to European countries where emission control regulations apply are specially equipped to control the emissions of hydrocarbons and carbon monoxide from the exhaust system.

On the Range Rover V8 engine crankcase emission control is achieved by venting the crankcase fumes to the intake manifold to be burnt in the combustion chambers.

Exhaust emissions are controlled by alterations to carburation characteristics and ignition settings. Carburetter adjustments and ignition timing are accurately set at the factory and under normal circumstances do not require attention except at the specified maintenance periods as detailed on the following pages.

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

If advice is needed, see the nearest Dealer.

Safety features

The more important of the safety features incorporated in the Range Rover are detailed below:

(a) **Brakes**

The Range Rover has primary and secondary braking, consisting of a dual line system, the front brakes having four pistons in two pairs, one pair piped separately, being the secondary system, the other pair combined with the rear brakes, being the primary system, and so designed to function should there be a failure to one or more component parts.

For instance, should the front secondary system fail, half the front brakes plus rear brakes will continue to operate. Conversely braking power will still be available if a component on the primary system fails, in which case half the front brakes will operate.

(b) **Steering**

Bulkhead located steering unit with jointed steering column ensures minimum direct penetration towards the driver if the vehicle is involved in an accident.

(c) **Seats**

High strength safety seats are fitted, with built-in lap and diagonal safety harness.

(d) Door lock anti-burst

Both front doors are fitted with an anti-burst device to prevent the doors flying open in the event of an accident.

(e) Interior mirror

Interior mirror with lens deflection for anti-dazzle night driving. The mirror stem is designed to 'break-out' of its spring-loaded seating if impacted.

(f) Hazard warning system

A switch operates all four flashers simultaneously; use the 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.

Notes on general maintenance

This Section has been prepared to give clear and simple information necessary for the efficient care and maintenance of your vehicle.

Lubrication and regular service maintenance are necessary to keep any vehicle in good mechanical condition and to minimise emissions during normal driving. All the items which require regular maintenance are shown in this Section in terms of mileage which would apply in a temperate climate. Climatic and operating conditions affect maintenance intervals to a large extent; in many cases, therefore, the determination of such intervals must be left to the good judgement of the owner or to advice from a Rover Distributor or Dealer, but the recommendations will serve as a firm basis for maintenance work.

Of particular importance are the following items:

IMPORTANT

1. Check engine oil level and water level in radiator daily or weekly depending on operating conditions.
2. Drain and refill engine sump every 10.000 km (6,000 miles) or every six months, whichever comes first.
3. Every week and every maintenance inspection check tyre pressures and inspect tyre treads; when high-speed touring or off-road driving the tyre pressures should be checked much more frequently, even to the extent of a daily check. See page 51. If front wheel tread wear is uneven, check wheel alignment.
4. Every month and every maintenance inspection check fluid level in brake fluid reservoir and battery acid level.
5. Brakes. Change brake fluid every 30.000 km (18,000 miles) or eighteen months. The fluid should also be changed before touring in mountainous areas if not done in the previous nine months. Use only Lockheed Brake and Clutch Fluid, Amber Specification current, 329S, from sealed tins.

   Renew all rubber seals in the complete brake system and all hydraulic hoses every 60.000 km (36,000 miles) or 3 years. Drain the brake fluid reservoir and flush the system. Refill with the correct fluid.
6. Owners are under a legal obligation 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 Rover Distributor or Dealer.

Fuel recommendations

The engine is designed to run on 91–93 research octane fuel, two-star grade in the United Kingdom.

Engine

Under adverse conditions, such as driving over dusty roads or where short stop-start runs are made, oil changes, attention to the engine flame traps and breather filter replacement must be more frequent.

Air cleaner

When the car is driven over dusty roads the elements should be changed more frequently.

Propeller shaft

Under tropical or sandy and dusty conditions, the sliding joint must be lubricated frequently to prevent ingress of abrasive materials.

Lubricants

The lubrication systems of your vehicle are filled with a high quality oil. You should alwa.s use a high quality oil of the correct viscosity range in the engine, gearboxes and axles during subsequent maintenance operations or when topping up. The use of oils not to the recommended specification can lead to high oil and fuel consumption, excessive wear and ultimately in damage to the engine, gearbox or axle compor.ents.

Oils to the recommended specification made by reputable manufacturers contain additives which disperse the corrosive acids formed by combustion and also prevent the formation of sludge which can block oilways. Additional additives should not be used.

Should for any reason such lubricants not be available in certain overseas territories, the Rover Distributor or Dealer for that territory will obtain specific guidance from Rover British Leyland UK Limited, or owners may communicate direct where they so wish.

1. On the following pages will be found full instructions on how to carry out the maintenance and adjustments required on the Range Rover models.

2. The sequence of operations under the headings of Passenger Compartment, Exterior, Underbody, Engine Compartment and Road Test will enable the work to be carried out in the most efficient manner.

3. Absolute cleanliness is essential when carrying out maintenance.

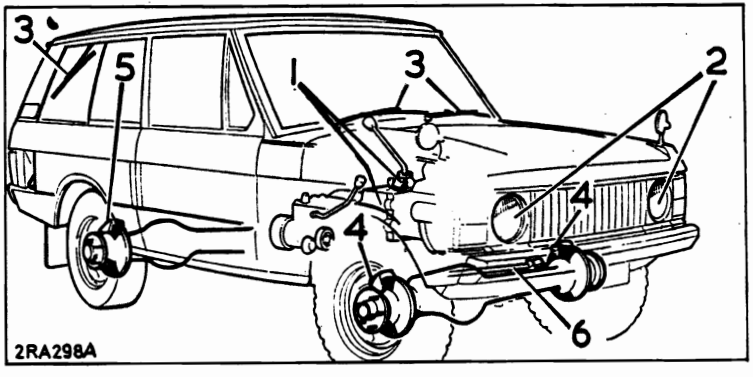
4. Throughout this section will be found a number of layout illustrations; these show the position of the various parts which require maintenance and are designed to give the owner assistance in quickly locating the items concerned.

In each case the numbers on the illustrations refer to the fig. numbers on the detail drawings that follow.

The numbers on the detail drawings refer to the paragraph numbers of the text.

Range Rover maintenance location points for:

1 Gearbox oil filler plug and dipstick
2 Headlamp unit adjustment
3 Wiper blade replacement
4 Front brake pads
5 Rear brake pads
6 Wheel alignment



PASSENGER COMPARTMENT

Steering—Every maintenance inspection.

1. Check steering wheel backlash—zero in straight ahead position. See your Distributor/Dealer if rectification is necessary.

Foot and handbrake—Every 5.000 km (3,000 miles) or 3 months.

2. Check operation of foot and handbrake, ensure that the brake pedal travel is not excessive and maintains a satisfactory pressure under normal working load. Excessive pedal travel indicates worn brake pads.

   If the brakes feel spongy, this may be caused by air in the hydraulic system and this must be removed by bleeding the system at the wheel disc cylinders. See page 103.

   Prior to this operation all hydraulic hoses, pipes and connections should be checked for leaks and any leaks rectified.

   Check operation of handbrake, ensure that it holds the vehicle satisfactorily. If adjustment is required see page 60.

Electrical equipment—Every maintenance inspection.

3. Check operation of all lamps, direction indicators and horns.

   See Data Section for replacement bulb and units.

Seats, safety harness and rear view mirror—Every 5.000 km (3,000 miles) or 3 months.

4. Check all seat fixings for security and examine condition of safety harness. Safety harness which have been used in an accident or are frayed or cut must be replaced.

   Check rear view mirror(s) for security and examine mirror face for signs of cracking or crazing.

Main gearbox oil level—Every 10.000 km (6,000 miles) or 6 months. Fig. 1.

Check oil level daily or weekly when operating under severe wading conditions.

1. Remove gearbox cover trim.
2. Remove oil level dipstick, located under the main gear lever sealing rubber, and check that oil level is up to the 'H' level mark on the dipstick.

   If oil is required, proceed as follows:
3. From beneath the vehicle remove the oil filler/level plug and top up to the bottom of the hole.
4. Replace the plug and check the level with the oil level dipstick.

   If significant topping up is required check for oil leaks at the drain plug and filler cap, all joint faces and through drain hole in the bell housing.

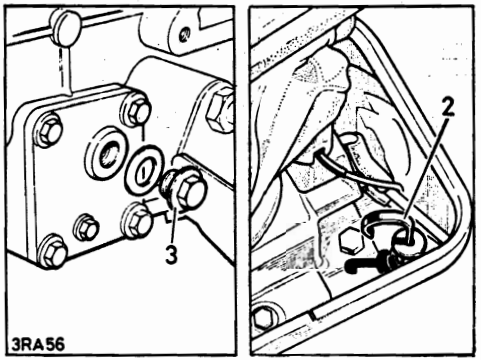


Fig. 1. Gearbox oil filler plug and dipstick

Door locks, bonnet release and window controls—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or six months.

Check operation of door locks, bonnet release control and window controls, rectify any faults as necessary.

Apply a few spots of oil as required.

EXTERIOR

Headlamp beam setting—Every maintenance inspection. Fig. 2.

This operation requires special equipment and should be carried out by your local Rover Distributor or Dealer.

In an emergency each headlamp unit can be adjusted by means of:

1. The headlamp horizontal adjusting screw.
2. The headlamp vertical adjusting screw.

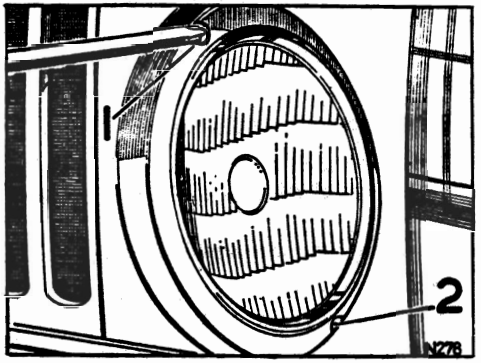


Fig. 2. Headlight unit adjustment

Wiper blades—Check, if necessary replace, every 5.000 km (3,000 miles) or 3 months. Fig. 3.

To replace wiper blades:

1. Pull wiper arm outwards.
2. Lift spring clip and withdraw blade from wiper arm.
3. To fit new blade reverse removal procedure.

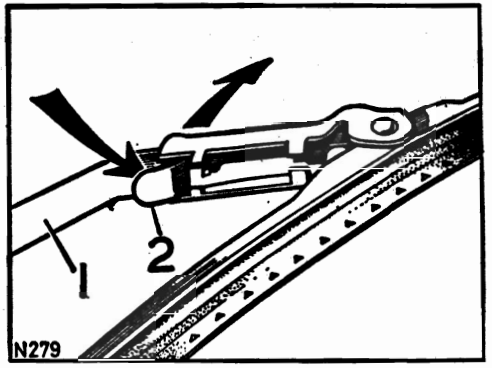


Fig. 3. Wiper blade replacement

Road wheels—Every maintenance inspection.

1. With the type of tyre used on Range Rover models, it is not considered advantageous to change the wheel positions; this in fact can give unpleasant handling characteristics when carried out, particularly if there is considerable difference between the wear pattern of one tyre and another.
2. Remove road wheels, wash and examine for possible damage.
3. For wheel removal, see page 115.

Before road wheel replacement, carry out the following operations.

Front brake pads—Every 5.000 km (3,000 miles) or 3 months. Fig. 4.

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

1. Check the thickness of the front brake pads and renew if the minimum is less than 3,0 mm (0.125 in.).
2. Check for oil contamination on brake pads and discs, also check condition of brake discs for wear and/or corrosion.
3. If replacement or rectification is necessary, this should be carried out by your local Rover Distributor or Dealer.

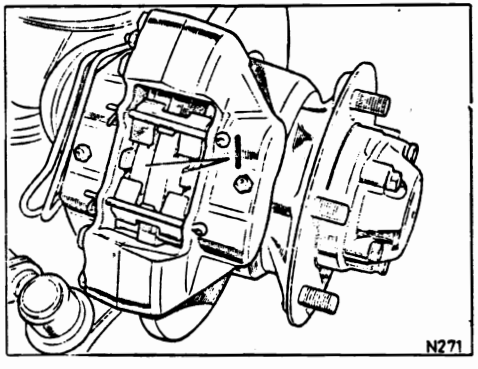


Fig. 4. Checking front brake pads

EXTERIOR

Rear brake pads—Every 5.000 km (3,000 miles) or 3 months. Fig. 5.

1. Hydraulic disc brakes are fitted at the rear and the correct brake adjustment is automatically maintained; no provision is therefore made for adjustment.
2. Check the thickness of the rear brake pads and renew if the minimum is less than 1,5 mm (0.062 in.).
3. Check for oil contamination on brake pads and discs and check condition of discs for wear and/or corrosion.
   Also check brake anti-squeal shims for corrosion.
4. If replacements or rectification is necessary, this should be carried out by your local Rover Distributor or Dealer.

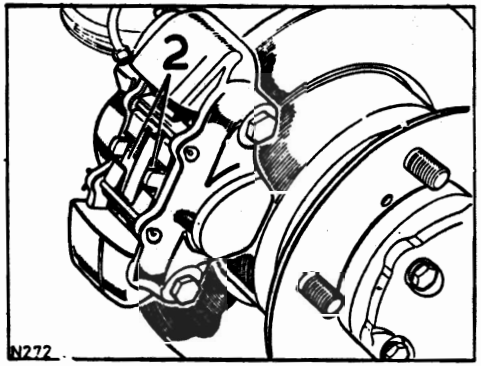


Fig. 5. Checking rear brake pads

Tyre pressures—Every week and at every maintenance inspection. Check every day when off-road driving.

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

Normal on- and off-road use

For all speeds and loads up to 226 kg (500 lbs):	Front	Rear
kg/cm²	1,8	1,8
lb/sq in.	25	25
bars	1,72	1,72

For all speeds and loads above 226 (500 lbs):	Front	Rear
kg/cm²	1,8	2,5
lb/sq in.	25	35
bars	1,72	2,4

Off-road 'emergency soft' use

Loads up to 226 kg (500 lbs) Maximum speed of 64 kph (40 mph):	Front	Rear
kg/cm²	1,1	1,1
lb/sq in.	15	15
bars	1,03	1,03

Loads above 226 kg (500 lbs) Maximum speed of 64 kph (40 mph):	Front	Rear
kg/cm²	1,1	1,8
lb/sq in.	15	25
bars	1,03	1,72

As soon as reasonable conditions are reached pressures should be restored to the normal 'on- and off-road' use as above.

2. Whenever possible check with the tyres cold, as the pressure is about 0,2 kg/cm² (3 lb/sq in.) 0,21 bars higher at running temperature.
3. Always replace the valve caps, as they form a positive seal.

4. **Warning: Range Rover models have radial-ply tyres as standard fitting, and whenever replacements are required radial-ply tyres must be fitted. Under no circumstances should cross-ply tyres be used as replacements. Always use the same make and type of radial-ply tyre throughout the vehicle.**

5. Check that pressures on all tyres, including the spare, are correct. Any unusual pressure loss in excess of 0,05 to 0,20 kg/cm² (1 to 3 lb/sq in.) 0,07 to 0,21 bars per week should be investigated and corrected.

   When high-speed touring the pressures should be checked much more frequently, even to the extent of a daily check. If front tyre tread is uneven, check wheel alignment.

6. It is an offence to run tyres where the tread pattern of the tyre does not have a depth of at least 1 mm throughout at least three-quarters of the breadth of the tread, and round the entire outer circumference of the tyre.

7. Check that there are no lumps or bulges in the tyres or exposure of the ply or cord structure.

   Clean off any oil or grease, using white spirit sparingly.

8. At the same time remove embedded flints, etc. from the treads 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.

9. It is advisable to run-in new tyres by driving at reasonable speeds for the first 400 km (250 miles) or so before driving at high speeds.

10. Wheel and tyre units are accurately balanced on initial assembly with the aid of clip-on weights secured to the wheel rims.

Warning: The Range Rover has permanent four-wheel drive. It is most important therefore that before any attempt is made to dynamically balance the wheels in position on the vehicle, the gearbox differential must be locked and the propeller shaft to the stationary wheels must be removed.

Failure to comply with these instructions could result in personal injury.

Wheel balance should always be checked whenever new tyres are fitted to ensure that the dynamic balance of the wheel and tyre are correct.

11. Replace road wheels in original position and finally check tightness of all road wheel nuts to a torque figure of between 10,0 and 11,7 kgf. m. (75 and 85 lbf. ft.).

Wheel alignment—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Fig. 6.

Special equipment is required to check wheel alignment and this work should be carried out by your local Rover Distributor or Dealer.

For those owners who have suitable equipment, the alignment should be 1,2 to 2,4 mm (0.046 to 0.093 in.) toe-out.

To adjust

1. Set the vehicle on level ground, with the road wheels in the straight-ahead position, and push it forward a short distance.
2. Slacken the clamps securing the adjusting shaft to the track rod.
3. Turn the adjusting shaft to decrease or increase the effective length of the track rod as necessary, until the toe-out is correct.
4. Re-tighten the clamps.
5. Push the vehicle rearwards, turning the steering wheel from side to side to settle the ball joints. Then with the road wheels in the straight-ahead position, push the vehicle forward a short distance.
6. Recheck the toe-out. If necessary carry out further adjustment.

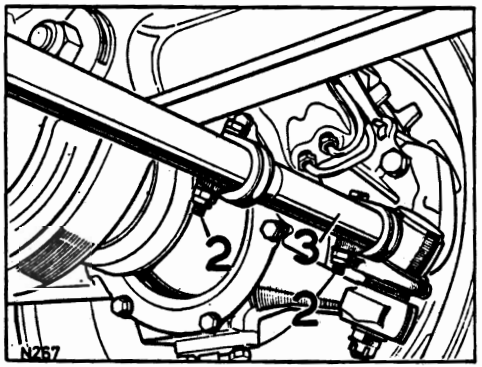
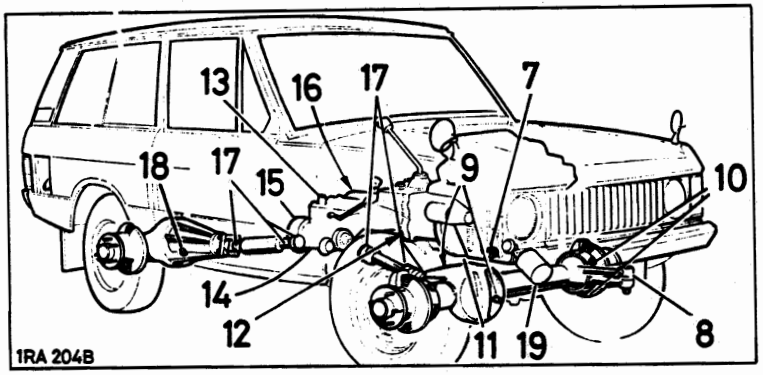


Fig. 6. Wheel alignment

UNDERBODY

Range Rover maintenance location points for:

7 Engine sump drain plug
8 Steering ball joints
9 Front differential oil level, filler and drain plugs
10 Swivel pin housing oil level/filler and drain plugs
11 Flywheel housing drain plug
12 Gearbox drain plug and filter
13 Transfer box oil level and filler plug
14 Transfer box drain plug
15 Transmission brake adjustment
16 Fuel pump filter cleaning
17 Propeller shaft lubrication
18 Rear differential oil filler, level and drain plugs
19 Engine oil filter



Every maintenance inspection

Examine underbody components for oil leaks; rectify as necessary.

Engine oil changes—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Fig. 7.

To change the engine oil:

1. Run the engine to warm up the oil; switch off the ignition.
2. Remove the drain plug in the bottom of the sump at left-hand side. Allow oil to drain away completely and replace the plug.

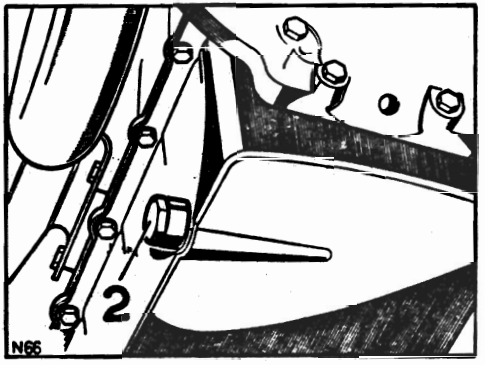


Fig. 7. Engine sump drain plug

Exhaust system, fuel, clutch and brake pipes—Every maintenance inspection.

1. Check exhaust system fixings for security paying particular attention to heat shields, flexible mountings, and pipe joints.
2. Examine the system for signs of leakage and blowing. Any silencers or pipes found to be leaking or badly corroded should be replaced.
3. At the same time check all fuel, clutch and brake pipes, unions and hoses for signs of leakage, corrosion, chafing or damage.

   Contact your Rover Distributor or Dealer if rectification work is necessary.

Steering ball joints—Every maintenance inspection. Fig. 8.

Check rubber boots daily when operating under arduous conditions.

1. The steering joints have been designed to retain the initial filling of grease for the normal life of the ball joints; however, this applies only if the rubber boot remains in the correct position.
2. Check to ensure that the rubber boots have not become dislodged or damaged, and check for wear in the joint.

   This can be done by moving the ball joint vigorously up and down. Should there be any appreciable free movement the complete joint must be replaced.

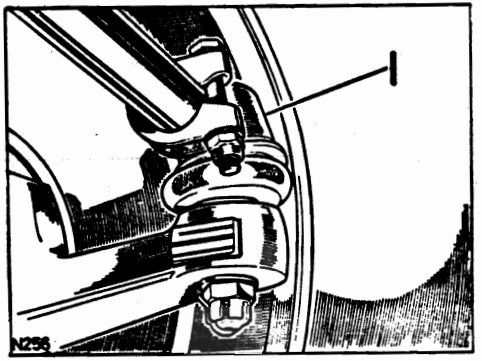


Fig. 8. Ball joints

UNDERBODY

Front differential oil level—Every 10.000 km (6,000 miles) or 6 months. Fig. 9.

1. Remove level plug and check oil level to the bottom of the level plug hole.
2. Top up if necessary through the filler plug on the rear of the differential.
3. If significant topping up is required, check for oil leaks at plugs, joint faces, and oil seals adjacent to axle shaft flanges and propeller shaft driving flange.

Front differential oil changes—At free service 1.500 km (1,000 miles) and thereafter every 40.000 km (24,000 miles) or 24 months. Fig. 9.

Drain and refill monthly under severe wading conditions.

To change the differential oil, proceed as follows:

4. Immediately after a run when the oil is warm drain off the oil by removing the drain plug.
5. Replace the drain plug and refill with oil of the correct grade. The capacity is approximately 1,7 litres (3 Imperial pints) 3.5 US pints.

Important: Do not overfill otherwise damage to the seals may occur.

The drain plug has a slotted head and can be removed with the aid of a single-ended spanner.

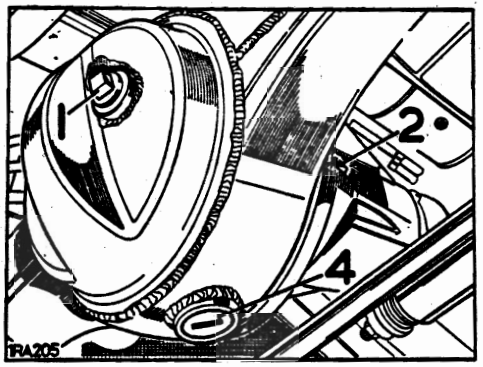


Fig. 9. Front differential oil level, filler and drain plugs

Swivel pin housing oil level—Every 10.000 km (6,000 miles) or 6 months. Fig. 10.

1. The front wheel drive universal joints and swivel pins receive their lubrication from the swivel pin housing.
2. Check oil level by removing the $\frac{1}{4}$ in. AF square-headed plug at the front of the swivel pin housing; oil should be level with the bottom of the hole.
3. Top up if necessary through the filler plug hole.
   If significant topping up is required, check for oil leaks at plugs, joint faces, and oil seals.

Swivel pin housing oil changes—Every 40.000 km (24,000 miles) or 24 months. Fig. 10.

Drain and refill monthly when operating under severe wading conditions.

To change the swivel pin housing oil, proceed as follows:

4. Immediately after a run, when the oil is warm, remove the drain plug from the bottom of each housing.
5. Allow the oil to drain away completely and replace drain plugs.
6. Refill with oil of the correct grade through the oil level/filler plug hole. The capacity of each housing is approximately 0,26 litres (0.5 Imperial pint), 0.5 US pint.

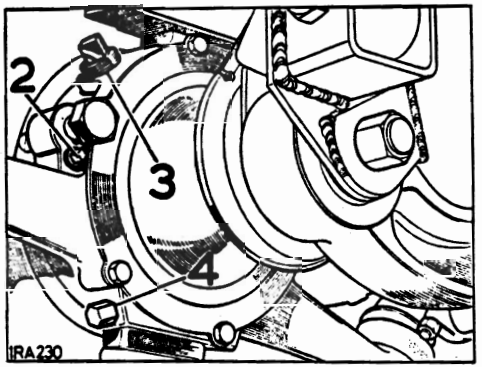


Fig. 10. Swivel pin housing oil level/filler and drain plugs

UNDERBODY

Flywheel housing drain plug—Every 5.000 km (3,000 miles) or 3 months. Fig. 11.

When in use for wading:

1. The flywheel housing can be completely sealed to exclude mud and water under severe wading conditions, by means of a plug fitted in the bottom of the housing.
2. The plug is screwed into the housing adjacent to the drain hole, and 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 and all oil allowed to drain off before the plug is replaced.

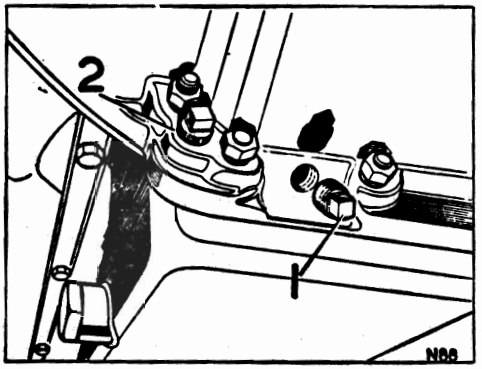


Fig. 11. Flywheel housing drain plug

Main gearbox oil changes—At free service 1.500 km (1,000 miles) and thereafter every 40.000 km (24,000 miles) or 24 months. Fig. 12.

Drain and refill monthly when operating under severe wading conditions.

To change the gearbox oil proceed as follows:

1. Immediately after a run when the oil is warm, drain off the oil by removing the drain plug and washer from the bottom of the gearbox casing.
2. Remove the oil filter.
3. Wash the filter in clean fuel; allow to dry and replace.
4. Refit drain plug and washer and refill gearbox through the oil filler plug, with the correct grade of oil, to the 'H' level mark on the dip-stick. See page 47.

   The capacity is 2,6 litres (4.5 Imperial pints) 5.5 US pints.

Important: Do not overfill, otherwise leakage may occur.

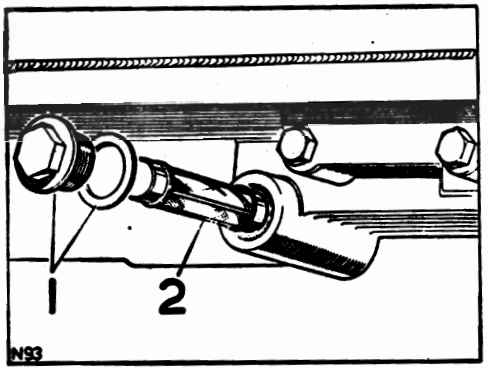


Fig. 12. Gearbox drain plug and filter

Transfer box oil level—Every 10.000 km (6,000 miles) or 6 months. Fig. 13.

Check oil level daily or weekly when operating under severe wading conditions.

1. To check oil level: remove the oil level plug, located on the rear of the transfer box casing; oil should be level with the bottom of the hole.
2. To top up: remove the round rubber blanking plug from the gearbox cover.
3. Remove the oil filler plug from the transfer box, and top up as necessary. If significant topping up is required, check for oil leaks at drain and filler plugs.

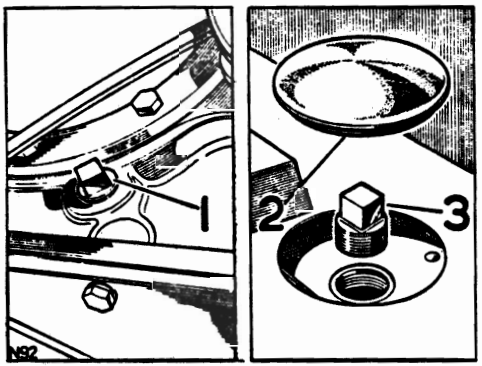


Fig. 13. Transfer box oil level and filler plug

Transfer gearbox oil changes—At free service 1.500 km (1,000 miles) and thereafter every 40.000 km (24,000 miles) or 24 months. Fig. 14.

Drain and refill monthly when operating under severe wading conditions.

To change the transfer box oil, proceed as follows:

1. Immediately after a run when the oil is warm, drain off the oil by removing the drain plug and washer from the bottom of the transfer box.
2. Replace the drain plug and washer and refill the transfer box through the oil filler plug, with the correct grade of oil, to the bottom of the oil level plug hole.
   The capacity is 3,1 litres (5.5 Imperial pints) 6.5 US pints.

Important: Do not overfill otherwise leakage may occur.

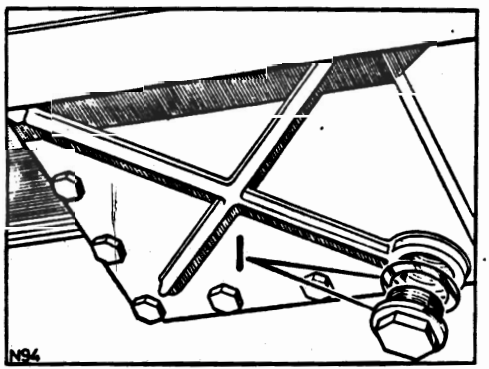


Fig. 14. Transfer box drain plug

UNDERBODY

Transmission fixings—At free service 1.500 km (1,000 miles) only.

Check security of transmission fixings; rectify as necessary.

Handbrake linkage—Every 10.000 km (6,000 miles) or 6 months.

The handbrake operates a mechanical brake unit mounted on the output shaft from the transfer box. Lubricate the handbrake linkage and check for worn parts. Take care not to contaminate the handbrake linings with oil.

Transmission brake adjustment—Fig. 15.

If the handbrake movement is excessive adjust as follows:

1. Set the vehicle on level ground.
2. Release the handbrake fully.
3. From beneath the vehicle, remove the rubber blanking plugs from the brake drum.
4. Move the vehicle either forwards or backwards until the adjuster can be seen through one of the apertures.
5. With a screwdriver turn the adjuster wheel until the brake shoes come into contact with the brake drum.
6. Turn the adjuster back two 'clicks' and replace blanking plugs.
7. Check that the handbrake operates correctly and holds the vehicle.

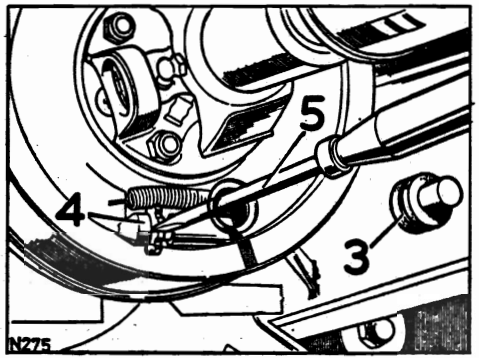


Fig. 15. Transmission brake adjustment

Electric fuel pump filter—Clean every 80.000 km (48,000 miles) or 48 months. Fig. 16.

The electric fuel pump is located on the heelboard beneath the rear seat, left-hand side.

To remove the filter for cleaning proceed as follows:

1. From beneath the vehicle disconnect the fuel inlet pipe from the pump and blank the end of the pipe by suitable means to prevent fuel draining from the tank.
2. Release the end cover from the bayonet fixing using a 0.625 in. AF spanner.
3. Withdraw the filter and clean by using a compressed air jet from the inside of the filter.
4. Remove the magnet from the end cover and clean. Replace the magnet in the centre of the end cover.
5. Reassemble the fuel pump and refit the fuel inlet pipe. Use a new gasket for the end cover if necessary.

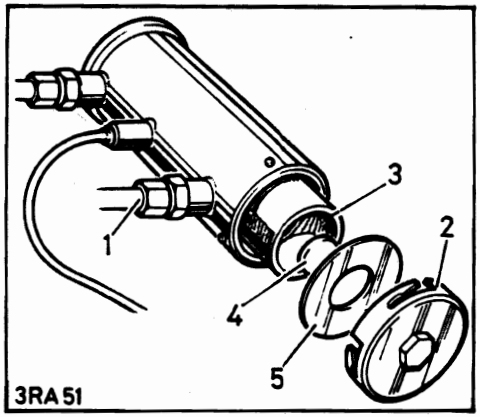


Fig. 16. Fuel pump filter cleaning

UNDERBODY

Propeller shaft lubrication—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Fig. 17.

1. Apply one of the recommended greases at the lubrication nipple on the sliding portion of the rear propeller shaft.
2. To the lubrication nipples fitted to the universal joints of both front and rear shafts.

Front propeller shaft sliding portion—Every 40.000 km (24,000 miles) or 24 months.

Lubricate the sliding spline on the front propeller shaft, with one of the recommended greases, as follows:

3. Disconnect one end of the propeller shaft.
4. Remove plug in sliding spline and fit a suitable grease nipple.
5. **Important:** Compress propeller shaft at sliding joint to avoid overfilling, then apply grease.
6. Replace grease nipple with plug and reconnect propeller shaft.

Rear differential oil level—Every 10.000 km (6,000 miles) or 6 months. Fig. 18.

1. Check oil level and top-up if necessary to the bottom of the filler plug hole, located on the right-hand side of the differential casing.
2. If significant topping up is required, check for oil leaks at plugs, joint faces, and oil seals adjacent to axle shaft flanges and propeller shaft driving flange.

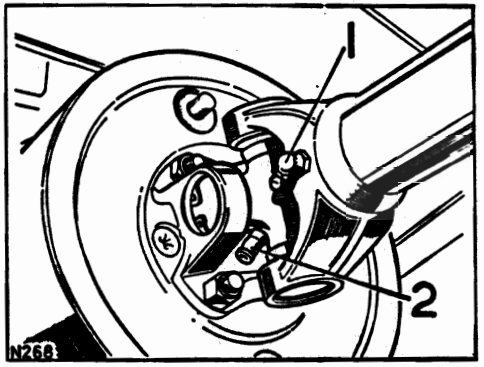


Fig. 17. Propeller shaft lubrication

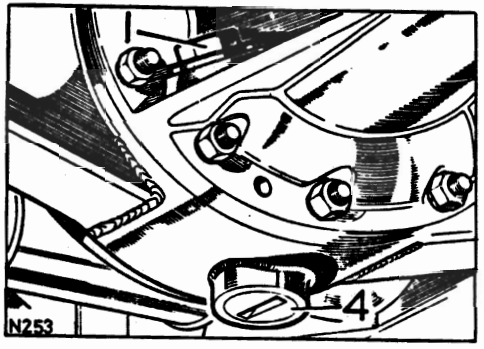


Fig. 18. Rear differential oil filler/level and drain plugs.

Rear differential oil changes—At free service 1.500 km (1,000 miles) and thereafter every 40.000 km (24,000 miles) or 24 months. Fig. 18.

3. Drain and refill monthly when operating under severe wading conditions.

To change the differential oil, proceed as follows:

4. Immediately after a run, when the oil is warm, drain off the oil by removing the drain plug.
5. Replace drain plug and refill with oil of the correct grade.
   The capacity is approximately 1,7 litres (3 Imperial pints) 3.5 US pints.

Important: Do not overfill otherwise damage to seals may occur. The drain plug has a slotted head and can be removed with the aid of a single-ended spanner.

Engine oil filter replacement—Every 10.000 km (6,000 miles) or 6 months. Fig. 19.

To change filter:

1. Place oil tray under engine.
2. Unscrew the filter anti-clockwise and discard. It may be necessary to use a strap spanner or similar tool to release the filter.
3. 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 oil pump cover face, then tighten a further half turn by hand only. Do not overtighten.
4. Refill with oil of the correct grade through the screw-on filler cap on the right-hand front rocker cover; the capacity is 5,5 litres (10 Imperial pints), 12 US pints. This includes 0,5 litres (1 Imperial pint), 1.2 US pints, for the filter.

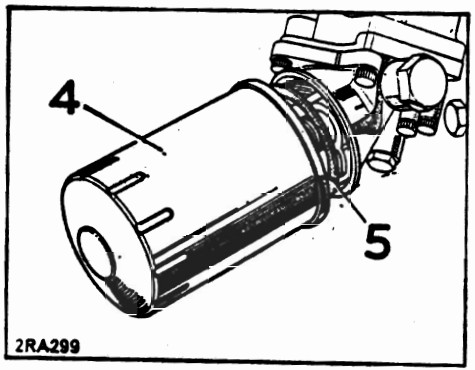
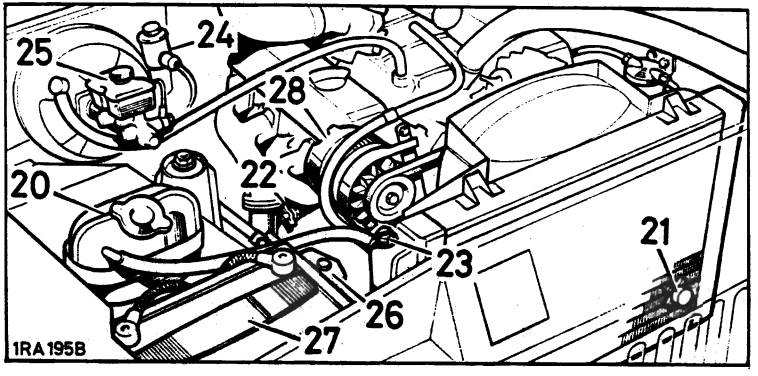


Fig. 19. Oil filter for engine

Range Rover maintenance location points for:

20 Coolant expansion tank filler cap
21 Radiator drain tap
22 Cylinder block drain tap
23 Radiator filler plug
24 Clutch fluid reservoir
25 Brake fluid reservoir
26 Steering box lubrication
27 Battery
28 Alternator



Radiator coolant level—Every 1.000 km (750 miles) and at every maintenance inspection. Fig. 20.

1. **To prevent corrosion of the aluminium alloy engine parts it is imperative that the cooling system is filled with a solution of water and the correct type of anti-freeze, winter and summer, or water and inhibitor during the summer only. Never fill or top up with plain water.**
2. The expansion tank filler cap is under the bonnet.
3. With a cold engine, the correct coolant level should be up to the 'Water Level' plate situated inside the expansion tank below the filler neck.

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

4. When removing the filler cap, first turn it anti-clockwise a quarter of a turn and allow all pressure to escape, before turning further in the same direction to lift it off.

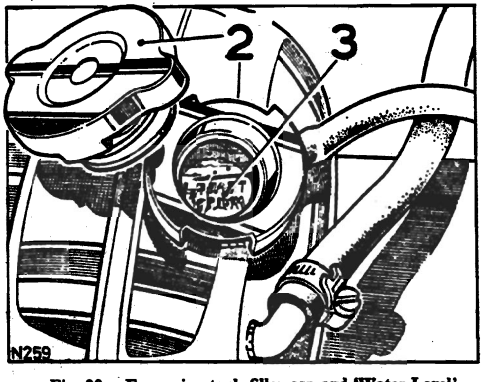


Fig. 20. Expansion tank filler cap and 'Water Level' plate

5. When replacing the filler cap it is important that it is tightened down fully, not just to the first stop. Failure to tighten the filler cap properly may result in water loss, with possible damage to the engine through overheating.

Use soft water whenever possible.

Cooling system—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months.

1. Examine the cooling and heater system for leaks and rectify as necessary.
2. Renew hoses every 80.000 km (48,000 miles).

Frost precautions and engine protection—Figs. 21, 22 and 23.

During both the winter and summer months special anti-freeze mixture is used in Range Rover models to prevent corrosion of the aluminium alloy engine parts. **It is most important, therefore, if the cooling system is drained or topped up at any time, to use a solution of water and anti-freeze during winter and summer, or water and inhibitor during the summer only.**

Recommended solutions are:

Anti-freeze—Bluecol AA, coloured green or anti-freeze to BS 3150 or Prestone or anti-freeze to MIL-E-5559. See note on following page.

Inhibitor—Marston Lubricants SQ36. Coolant inhibitor concentrate.

Use one part of anti-freeze to two parts of water.

Use 19 cc of inhibitor per litre of water (3 fluid ounces of inhibitor per gallon of water).

Anti-freeze can remain in the cooling system and will provide adequate protection for two years provided that the specific gravity of the coolant is checked before the onset of the second winter and topped up with new anti-freeze as required.

ENGINE COMPARTMENT

After the second winter the system should be drained and thoroughly flushed by using a hose inserted in the radiator filler orifice. Before adding new anti-freeze examine all joints and renew defective hoses to make sure that the system is leakproof.

At the lower limit of protection, a mixture of water and anti-freeze will reach a 'mushy' state with a viscosity that can impair circulation and immobilize or damage the water pump. Therefore, consult the following chart for concentration of anti-freeze required to protect the system at temperatures likely to be encountered.

ANTI-FREEZE CONCENTRATION		25%	30%	35%	50%
SPECIFIC GRAVITY OF COOLANT AT 15.50°C (60°F)		1.039	1.048	1.054	1.076
DEGREE OF PROTECTION	**Complete** Car may be driven away immediately from cold	−12°C 10°F	−16°C 3°F	−20°C − 4°F	−36°C −33°F
	Safe Limit Coolant in a mushy state. Engine may be started and driven away after short warm-up period	−18°C 0°F	−22°C − 8°F	−28°C −18°F	−42°C −42°F
	Lower Protection Prevents frost damage to cylinder head, block and radiator. Thaw out before starting the engine	−26°C −14°F	−32°C −25°F	−37°C −35°F	−47°C −53°F

To change the solution proceed as follows:

1. **Ensure that the cooling system is leak-proof; anti-freeze solutions are far more searching at joints than water.**
2. **Drain and flush the system, radiator drain plug located on bottom left-hand side.**

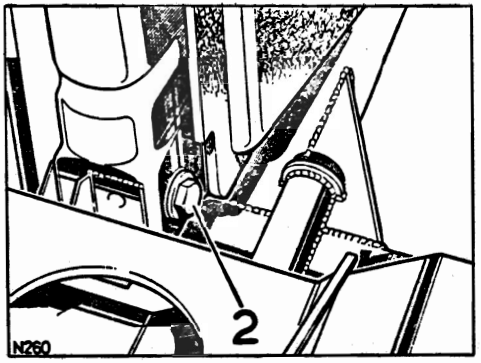


Fig. 21. Radiator drain plug

3. Drain taps on cylinder block, at right-hand and left-hand sides.

4. Remove radiator filler plug and washer located on top right-hand side

5. Pour in approximately 4,5 litres (one gallon) of water, add the recommended quantity of anti-freeze or inhibitor if frost protection is not required.

6. Top up the radiator with water, refit the radiator filler plug and washer securely.

7. Add water to the expansion tank, up to the 'Water Level' plate, and replace cap.

8. Run the engine until normal operating temperature is attained, that is, thermostat open. Allow the engine to cool, then check the coolant level and top up if necessary.

Range Rover models have the cooling system filled with 33⅓% of anti-freeze mixture. This gives protection against frost down to minus 32°C (25°F). Vehicles so filled can be identified by the green label tied to the radiator.

Bluecol AA is a British Standard 3150 type anti-freeze. When this type is not available in service, use either 'Prestone' or anti-freeze to the specification MIL-E-5559.

Note: When 'Prestone' is to be used after BS 3150, SQ36 or MIL-E-5559, empty the coolant, refill with water; run the engine to circulate the coolant throughout the system; stop the engine; empty the coolant; repeat filling with water, running and emptying once more. Finally swill out by use of a hose and running water into the expansion tank for a few minutes with the exit taps open, then close taps and fill with the appropriate amount of water and 'Prestone' as detailed previously.

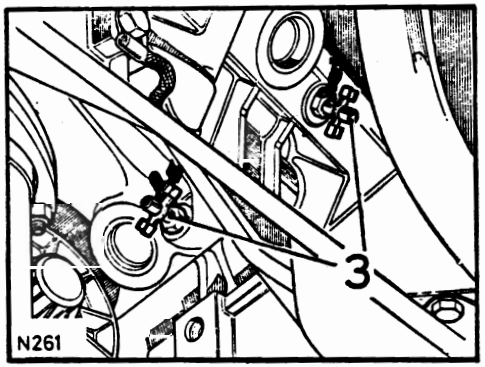


Fig. 22. Cylinder block drain taps

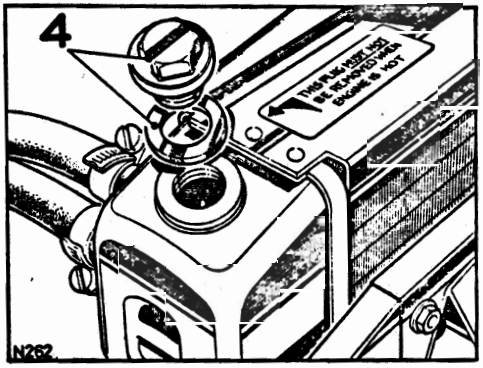


Fig. 23. Radiator filler plug

ENGINE COMPARTMENT

Every maintenance inspection
Check for oil leaks in engine compartment; rectify as necessary.

Clutch fluid reservoir—Every maintenance inspection. Fig. 24.

1. Check the fluid level in the reservoir, mounted on the bulkhead adjacent to the brake servo.
2. Remove the cap; top up if necessary to bottom of filler neck.
   Use Lockheed Brake and Clutch Fluid Specification, current 329S and US Federal Standard 116.
   If significant topping up is required, check for leaks at master cylinder, slave cylinder, and connecting pipes.

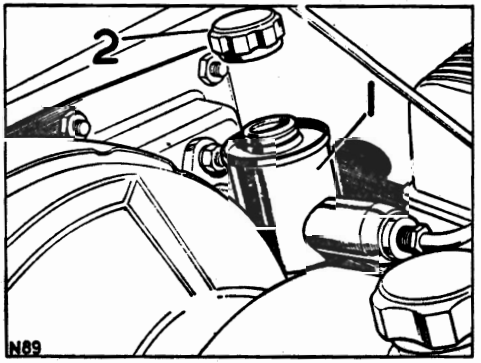


Fig. 24. Clutch fluid reservoir

Braking system

The primary and secondary dual line braking system fitted to the Range Rover is designed to function should there be a failure of one or more of its component parts.

For example, in the event of failure to a component part of the primary system, the secondary braking system will continue to operate. Conversely, in the event of a failure to a component on the secondary brakes, braking will still be available to the primary system.

The system consists of a brake servo tandem reservoir unit fitted with a master cylinder, located on the right-hand bulkhead. This assembly feeds a reaction valve attached to the right-hand wing valance, and thence to each wheel cylinder.

The red warning light on the instrument panel marked 'BRAKE' is most important, and is arranged to warn you of a fluid leakage from either the primary or secondary braking system. Should there be a leakage the warning light will come on when the foot brake is applied, and go out when pedal pressure is released.

The brake warning light is also arranged to come on when the hand brake is applied. If the warning light is illuminated during normal running before a fault is suspected in the hydraulic system it should be ascertained that the handbrake lever is in the fully 'off' position, otherwise the vehicle should be stopped immediately and the cause investigated.

Brake fluid reservoir—Every month and at every maintenance inspection. Fig. 25.

The tandem brake reservoir is integral with the servo unit and master cylinder.

1. Remove cap to check fluid level; top up if necessary until the fluid reaches the bottom of the filler neck. Use Lockheed Brake and Clutch Fluid Specification, current 329S and US Federal Standard 116 from sealed tins.
2. If significant topping up is required check master cylinder, brake disc cylinders and brake pipes and connections 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.

Steering box lubrication—At free service 1.500 km (1,000 miles) and thereafter every 20.000 km (12,000 miles) or 12 months. Fig. 26.

1. Check oil level and top-up if necessary to 12,7 mm (0.5 in.) below the filler plug hole on the top of the cover plate. Do not overfill otherwise leakage may occur.
2. If significant topping up is required check for oil leaks at joint faces and rocker shaft oil seal.

Steering unit—Every maintenance inspection.

Check condition of steering unit fixings for security, rectify as necessary.

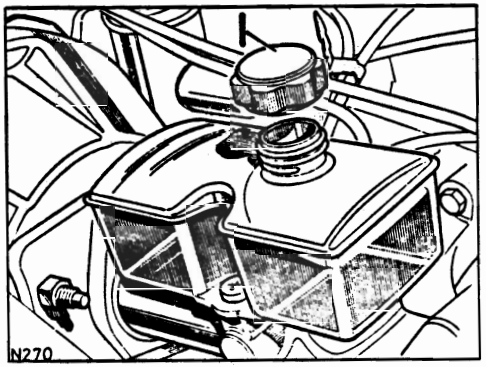


Fig. 25. Brake fluid reservoir

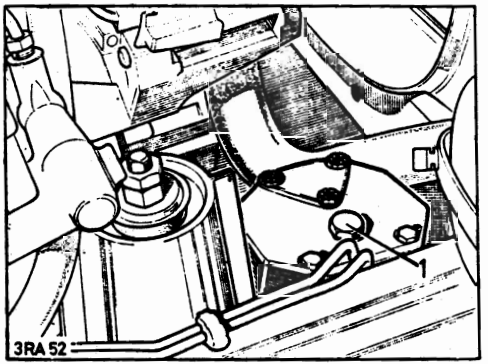


Fig. 26. Steering box lubrication

ENGINE COMPARTMENT

Battery acid level—Every month and at every maintenance inspection. Fig. 27.

The specific gravity of the electrolyte should be checked at every maintenance inspection.

Readings should be:

Temperate climates below 26.5°C (80°F) as commissioned for service, fully charged 1.270 to 1.290 specific gravity.

As expected during normal service three-quarter charged 1.230 to 1.250 specific gravity.

If the specific gravity should read between 1.190 to 1.210, half-charged, the battery must be bench charged and the electrical equipment on the vehicle should be checked.

Tropical climate, above 26.5°C (80°F) as commissioned for service, fully charged 1.210 to 1.230 specific gravity.

As expected during normal service three-quarter charged 1.170 to 1.190 specific gravity.

If the specific gravity should read between 1.130 to 1.150, half-charged, the battery must be bench charged and the electrical equipment on the vehicle should be checked.

The battery is located under the bonnet.

Check acid level as follows:

1. Remove the battery lid.
2. If necessary add sufficient distilled water to raise the level to the top of the separators; do NOT overfill.
3. Avoid the use of naked lights when examining the cells.
4. In hot climates it will be necessary to top up the battery at more frequent intervals.
5. In very cold weather it is essential that the vehicle is used immediately after topping up to ensure that the distilled water is thoroughly mixed with the electrolyte. Neglect of this precaution may result in the distilled water freezing and causing damage to the battery.

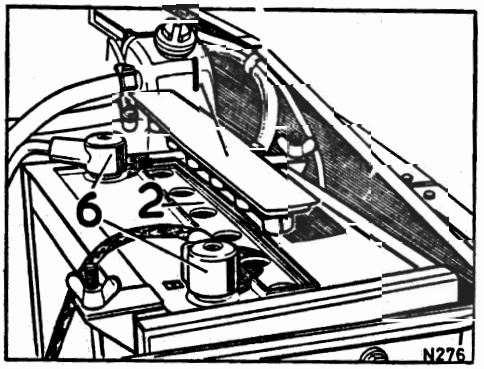


Fig. 27. Battery

Battery terminals—Every 10.000 km (6,000 miles) or 6 months. Fig. 27.

6. Remove battery terminals, clean, grease with petroleum jelly and refit.
7. Replace terminal screw; do not overtighten. Do not use the screw for pulling down the terminal.
8. Do NOT disconnect the battery cables while the engine is running or damage to alternator semiconductor devices may occur. It is also inadvisable to break or make any connection in the alternator charging and control circuits while the engine is running.
9. It is essential to observe the polarity of connections to the battery, alternator and regulator, as any incorrect connections made when reconnecting cables may cause irreparable damage to the semiconductor devices.

Alternator—Every 20.000 km (12,000 miles) or 12 months. Fig. 28.

1. The alternator is a sealed unit, and requires no lubrication or maintenance.
2. Check and ensure that any dirt or oil which may have collected around the apertures in the slip-ring end bracket and moulded cover is wiped clear.

Note. Alternator charging circuit
The ignition warning light is connected in series with the alternator field circuit. Bulb failure would prevent the alternator charging, except at very high engine speeds, therefore the bulb should be checked before suspecting an alternator fault.

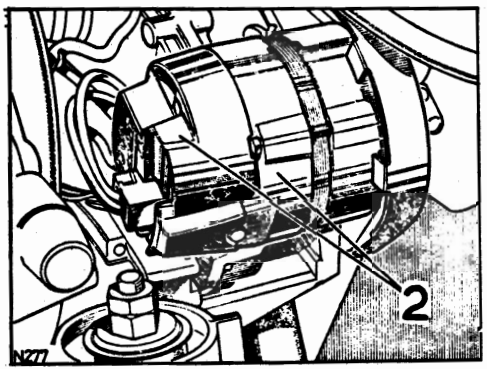
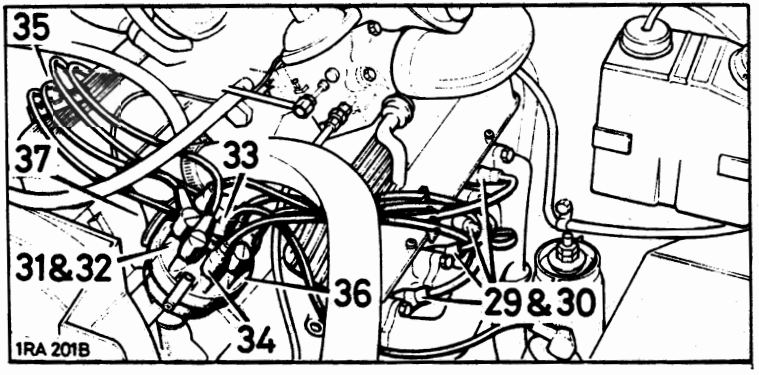


Fig. 28 Alternator slip-ring end bracket and moulded cover

Range Rover maintenance location points for:

29 Spark plug removal
30 Spark plug cleaning
31 } Distributor
32 } contact points
33 Distributor maintenance
34 Sequence of distributor leads
35 Layout of high tension leads
36 Dwell angle adjustment
37 Setting ignition timing



Spark plugs—Check every 10.000 km (6,000 miles) or 6 months. Replace every 20.000 km (12,000 miles) or 12 months. Figs. 29 and 30.

1. **Use the special spark plug spanner and tommy bar** supplied in the tool kit when removing or refitting spark plugs.
2. **Take great care when fitting spark plugs not to cross-thread the plug, otherwise costly damage to the cylinder head will result.**
3. Check or replace the spark plugs as applicable. If the plugs are in good condition, clean and reset the electrode gaps to 0,60 mm (0.025 in.), at the same time file the end of the central electrode until bright metal can be seen.
4. It is important that only Champion L92Y spark plugs are used for replacements.
5. Incorrect grades of plug may lead to piston over-heating and engine failure.

To remove spark plugs proceed as follows:

6. Remove the leads from the spark plugs.
7. Using the **special spark plug spanner and tommy bar** supplied in the vehicle tool kit, remove the plugs and washers.
8. To clean the spark plugs:
   (a) Fit the plug into a 14 mm adaptor of an approved spark plug cleaning machine.
   (b) Wobble the plug in the adaptor with a circular motion for **three or four seconds only** with the abrasive blast in operation.
   Important: Excessive abrasive blasting will lead to severe erosion of the insulator nose. Continue to wobble the plug in its adaptor with **air only**, blasting the plug for a minimum of **30 seconds**; this will remove abrasive grit from the plug cavity.
   (c) 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.
9. Set the electrode gap to the recommended clearance of 0,60 mm (0.025 in.).
10. Shows dirty plug.
11. Filing plug electrodes.
12. Clean plug set to correct gap.
13. Test the plugs in accordance with the plug cleaning machine manufacturer's recommendations.
14. If satisfactory the plugs may be replaced in the engine.
15. When pushing the leads on to the plugs, ensure that the shrouds are firmly seated on the plugs.

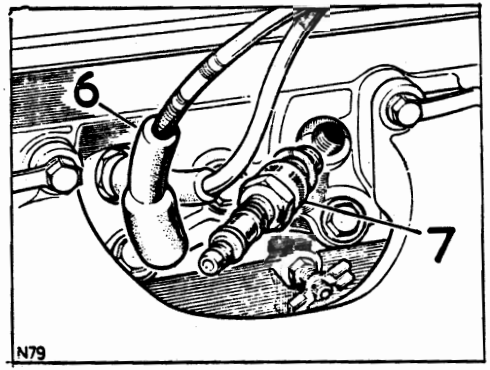


Fig. 29. Spark plug, right-hand side illustrated

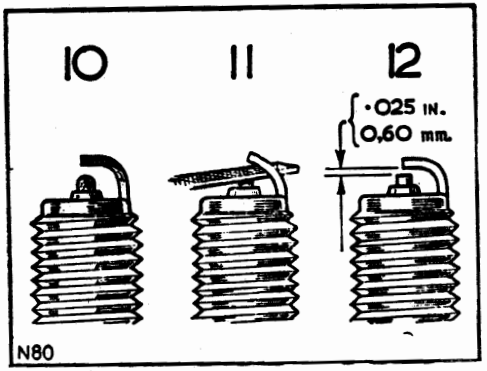


Fig. 30. Cleaning spark plugs

ENGINE COMPARTMENT

Distributor contact points—Check at free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Replace every 20.000 km (12,000 miles) or 12 months. Figs. 31 and 32.

To obtain satisfactory engine performance it is most important that the contact points are adjusted to the dwell angle which is 26° to 28°, using suitable workshop equipment. This work should be carried out by your local Rover Distributor or Dealer.

1. Remove distributor cap.
2. Remove the nut on the terminal block.
3. Lift off the spring and moving contact.
4. Remove adjustable contact, secured with a screw.
5. Add a smear of grease to contact pivot before fitting new contact points. Then carry out distributor maintenance followed by setting the ignition timing and dwell angle.

   However, when it becomes necessary to change the contact points and specialised checking equipment is not available, they may be adjusted either by the feeler gauge or alternatively the timing lamp method.

   Proceed as follows:

   Checking contact points—*feeler gauge method*
6. Turn the engine in direction of rotation until the contacts are fully open.
7. The clearance should be 0,35 to 0,40 mm (0.014 to 0.016 in.) with the feeler gauge a sliding fit between the contacts.
8. Adjust by turning the adjusting nut clockwise to increase gap or anti-clockwise to reduce gap.
9. Replace the distributor cap.

   At the first available opportunity after the contact points have been adjusted as detailed above they must be finally set to the dwell angle using specialised equipment.

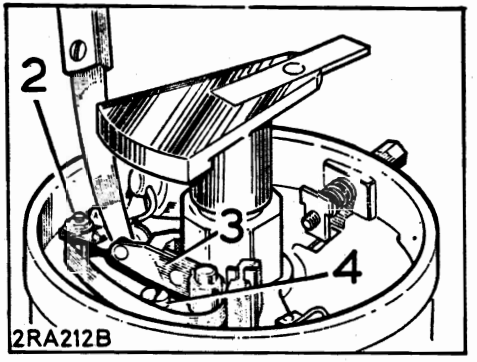


Fig. 31. Distributor contact points adjustment using the feeler gauge method

10. At the same time check the ignition timing which should be dynamically set to 5° ATDC at 600 revs/min. When new contact points have been fitted, the dwell angle must be checked after a further 1.500 km (1,000 miles) running.

Checking contact points—*timing lamp method*

11. Remove distributor cap.
12. Turn the engine in the direction of rotation until the contact breaker heel is on the peak of number one cylinder cam. Points should be fully open.
13. Connect a 12 volt timing lamp, or suitable voltmeter, across the contact breaker lead terminal and a suitable earth point.
14. Switch on the ignition.
15. Turn the distributor adjusting nut **anti-clockwise** until the timing lamp goes out, or there is no reading on the voltmeter.
16. Continue a further two turns of the adjuster in an anti-clockwise direction.
    During this operation the adjusting nut should be pressed inwards with the thumb to assist the helical return spring.
17. Slowly turn the adjusting nut **clockwise** until the timing lamp just comes on, or there is a voltage shown on the voltmeter.
18. Noting the position of the flats on the adjusting nut, continue in a clockwise rotation for a further **five** flats.
19. Remove timing lamp or voltmeter and switch off ignition.
20. Replace the distributor cap.
    At the first available opportunity after the contact points have been adjusted as detailed above, they must be finally set to the dwell angle using specialised equipment.
21. At the same time, check the ignition timing, which should be dynamically set to 5° ATDC at 600 revs/min. When new contact points have been fitted, the dwell angle must be checked after a further 1.500 km (1,000 miles) running.

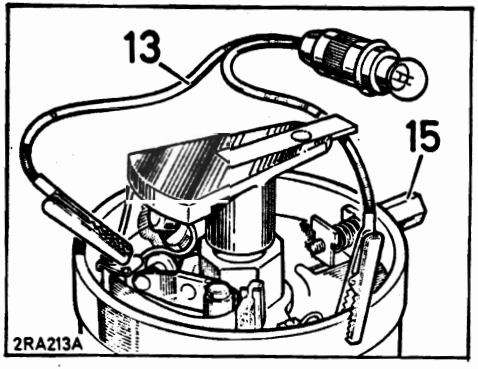


Fig. 32. Distributor contact points adjustment using the timing lamp method

ENGINE COMPARTMENT

Distributor maintenance—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Fig. 33.

Lubricate as follows:

1. Remove distributor cap.
2. Remove rotor arm.
3. Lightly smear the cam with clean engine oil.
4. Add a few drops of thin machine oil to lubricate the cam bearing and distributor shaft.
5. Wipe the inside and outside of the distributor cap with a soft dry cloth.
6. Ensure that the carbon brush works freely in its holder.
7. Replace rotor arm and distributor cap.

High tension leads—Check every 20.000 km (12,000 miles) or 12 months. Figs. 34 and 35.

1. A careful examination should be carried out on all high-tension leads, including the coil to distributor lead.
2. Look for any signs of insulation cracking or deterioration and corrosion at the end contacts.
3. Replace any faulty leads.
4. The correct sequence of plug leads is shown in Fig. 34.
   The numbers and letters in the circles indicate spark plug numbers and also the right-hand (RH) or left-hand (LH) bank of the engine to which the leads go.
5. High tension leads must be replaced in the correct relationship to each other, as well as ensuring correct firing order. Failure to do this will result in cross firing.
   The numbers in the arrowed circles, Fig. 35, show the plug lead numbers.
6. Loose clips locating leads.
7. Locating clips fixed to rocker cover.

Note: The electrical leads to the ignition coil are fitted with male and female connectors; ensure that they are fitted to the correct blade on the coil.

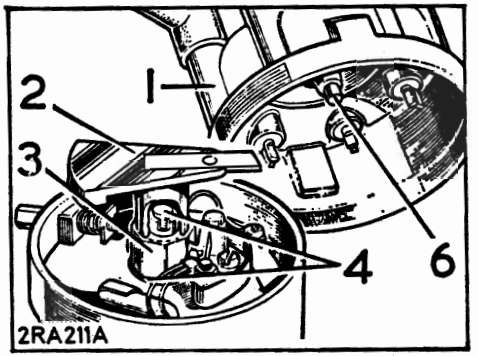


Fig. 33. Distributor maintenance

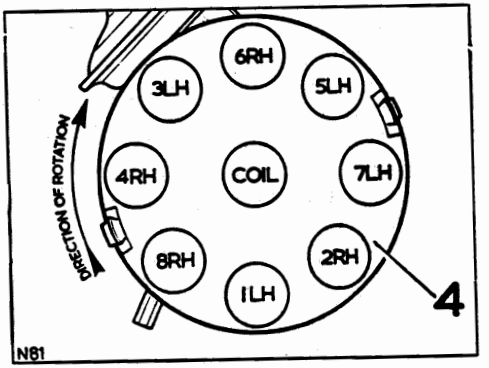


Fig. 34. Sequence of distributor leads

Setting dwell angle and ignition timing—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Figs. 36 and 37.

1. The accurate setting of ignition timing is of extreme importance, and the correct functioning of the emission control system relies to a large extent on its accuracy. It is necessary to set the ignition timing dynamically with the engine at idling speed. It is obvious therefore that this work should be carried out by a Rover or British Leyland Motor Dealer.

2. A special ignition distributor is included in the specification. The distributor provides a retarded ignition setting at the lower speed range whilst maintaining the normal advance characteristics at higher engine speeds. The distributor, together with the other modifications embodied, reduces exhaust emissions to an acceptable level.

   Failure to set ignition timing correctly, as subsequently described, will almost certainly result in the vehicle failing to comply with emission control regulations and can also lead to engine damage.

   To ensure correct combustion, and therefore compliance with the exhaust emission regulations, it is essential that the ignition timing is dynamically set with the engine at idling speed. This requires the use of a suitable tachometer, for determining the engine speed, and a stroboscopic lamp for determining the points in the engine cycle at which the ignition sparks occur.

Dwell angle: 26° to 28°.

Ignition timing when using fuel of 91 to 93 octane rating:
Static ignition timing: 7° BTDC.

Dynamic ignition timing: 5° ATDC at 600 revs/min.

Ignition timing when using fuel of 85 to 91 octane rating:
Static ignition timing: 4° BTDC.

Dynamic ignition timing: 8° ATDC at 600 revs/min.

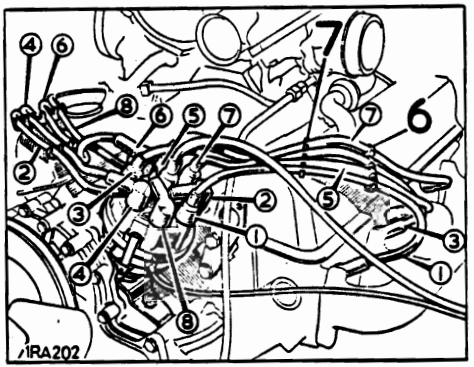


Fig. 35 Layout of high-tension leads

ENGINE COMPARTMENT

Carry out item 3 only if distributor has been disturbed.

3. Set ignition timing statically to 7° BTDC or 4° BTDC as applicable, prior to the engine being run, by the basic timing lamp method. (This sequence is to give only an approximation in order that the engine may be run. The engine must not be started after distributor replacement until this check has been carried out).
4. Set dwell angle as follows:
5. Start engine and set to an idling speed of 600 revs/min.
6. Set selector knob to 'calibrate' position on the tach/dwell meter. Adjust calibration knob to give a zero reading on the meter.
7. Couple meter to engine following manufacturer's instructions.
8. Set selector knob to 8 cylinder position and tach/dwell selector knob to 'dwell'. Adjust distributor dwell angle by turning the hexagon-headed adjustment screw on the distributor until the meter reads 26° to 28°.
9. Uncouple tach/dwell meter.
   Care should be taken to switch the tach/dwell meter selector switch to the 'off' position after use, otherwise battery life will be impaired.

Set ignition timing as follows:

10. Couple a stroboscopic timing lamp to the engine following the manufacturer's instructions, with the high tension lead attached into No. 1 cylinder plug lead.

    Note: The two vacuum pipes must not be disconnected from the distributor vacuum capsule.

11. Start the engine and set to an idling speed of 600 revs/min. using an accurate tachometer.

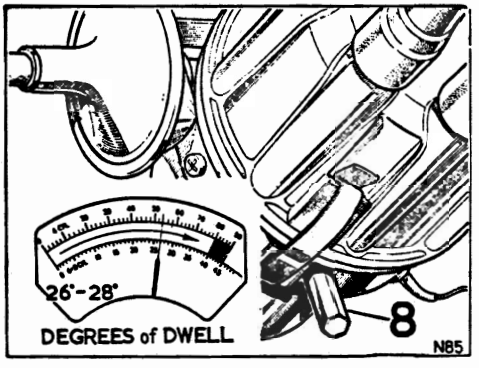


Fig. 36. Dwell angle adjustment

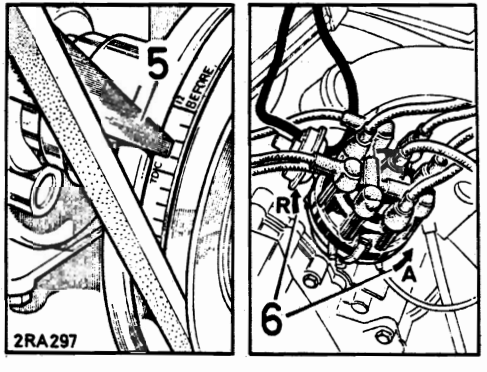


Fig. 37. Setting ignition timing

12. Slacken distributor clamping bolt.

13. Turn the distributor body until the stroboscopic lamp synchronises the timing pointer and the timing mark at 5° ATDC or 8° ATDC, as applicable, on the vibration damper rim.

14. Arrow (R) indicates direction to retard ignition. Arrow (A) indicates. direction to advance ignition.

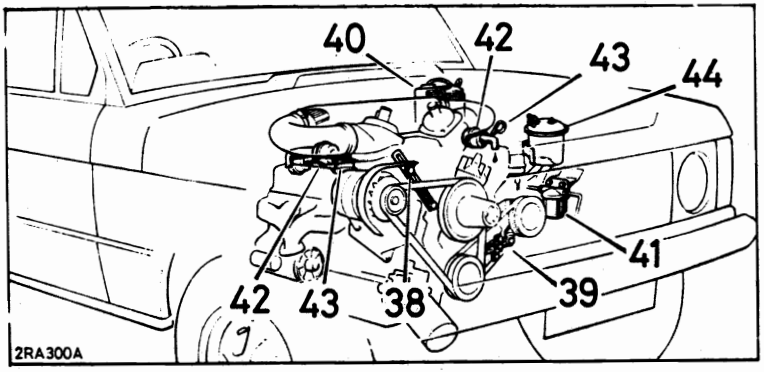
15. Re-tighten the distributor clamping bolt.

16. Switch off the engine and disconnect stroboscopic timing lamp and tachometer.

Note. Engine speed accuracy during ignition timing is of paramount importance. Any variation from the required 600 revs/min, particularly in an upward direction, will lead to wrongly set ignition timing.

Range Rover maintenance location points for:

38 Fan belt adjustment
39 Power steering pump belt adjustment (as applicable)
40 Screen washer reservoir
41 Fuel filter element
42 Engine flame traps
43 Engine oil filler cap and oil level disptick
44 Power steering fluid reservoir (as applicable)



Fan belt adjustment—Check every maintenance inspection. Fig. 38.

Check adjustment again whenever a new fan belt is fitted, after approximately 1.500 km (1,000 miles) running.

1. Check by thumb pressure between alternator and crankshaft pulleys. Movement should be: 11 to 14 mm (0.437 to 0.562 in.).

   If necessary adjust as follows:

2. Slacken the bolts securing the alternator to the mounting bracket.
3. Slacken the fixings at the top and bottom of the adjustment link.
4. 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.
5. Finally tighten the nut securing the bottom of the adjustment link and the two mounting bracket bolts.

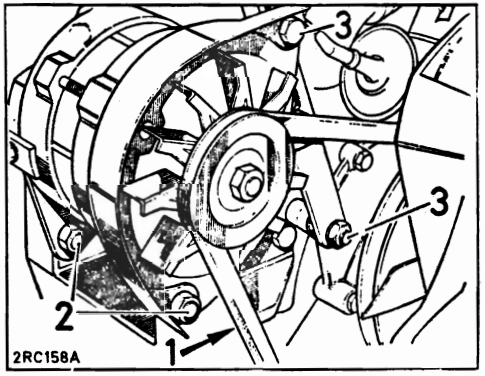


Fig. 38. Fan belt adjustment

Power steering pump belt adjustment, as applicable—Every maintenance inspection. Fig. 39.

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 11 to 14 mm (0.437 to 0.562 in.).

If adjustment is necessary:

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

Engine mountings—At free service 1.500 km (1,000 miles) only.

Check security of engine mountings; rectify as necessary.

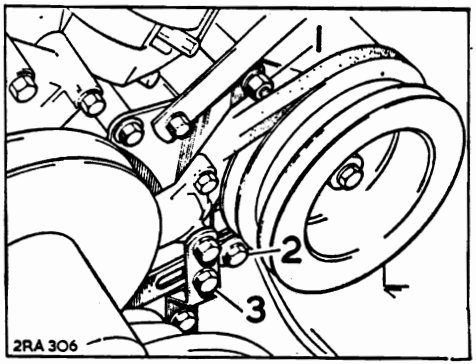


Fig. 39. Power steering pump belt adjustment

ENGINE COMPARTMENT

Water level, windscreen and rear screen washer reservoir—Every 1.000 km (750 miles) and at every maintenance inspection. Fig. 40.

The windscreen/rear screen reservoir is located on the left-hand bulkhead.

1. Remove reservoir cap by turning anti-clockwise.
2. Top up reservoir to within approximately 25 mm (1 in.) below bottom of filler neck.
3. Use a screen washer solvent in the reservoir, this will assist in removing mud, flies and road film.
4. In cold weather, to prevent freezing of the water, add 'Isopropyl Alcohol' or methylated spirits.

Fuel filter element—Replace at free service 1.500 km (1,000 miles) and thereafter every 20.000 km (12,000 miles) or 12 months. Fig. 41.

The element provides a filter between the pump and carburetter and is located on the front LH wing.

Replace as follows:

1. Unscrew the centre bolt.
2. Withdraw the filter bowl.
3. Remove the small sealing ring and remove element.
4. Withdraw the large sealing ring from the underside of the filter body.
5. Discard the old element and replace with a new unit.
6. Ensure that the centre and top sealing rings are in good condition and replace as necessary.
7. Fit new element, small hole downwards.
8. Refit sealing rings.
9. Replace filter bowl and tighten the centre bolt.

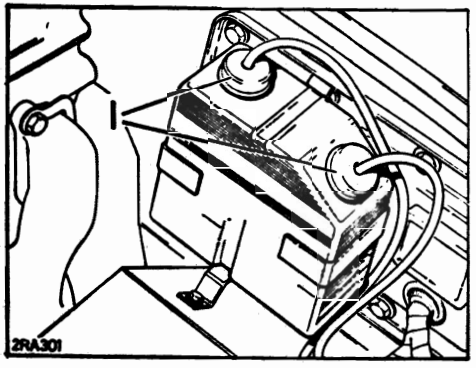


Fig. 40. Screen washer reservoir

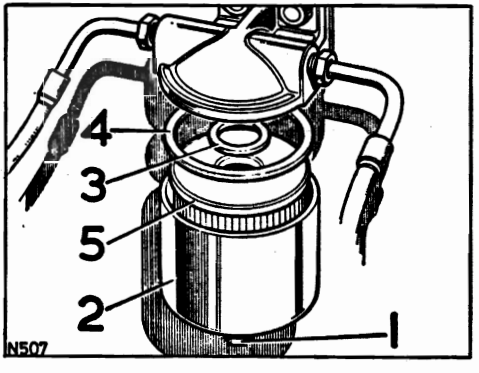


Fig. 41. Fuel filter

Engine flame traps—Every 20.000 km (12,000 miles) or 12 months. Fig. 42.

Replace as follows:

1. Pull the hoses clear of the retaining clips.
2. Withdraw the flame traps from the hoses.
3. Fit new flame traps into hoses and replace hoses to clips.

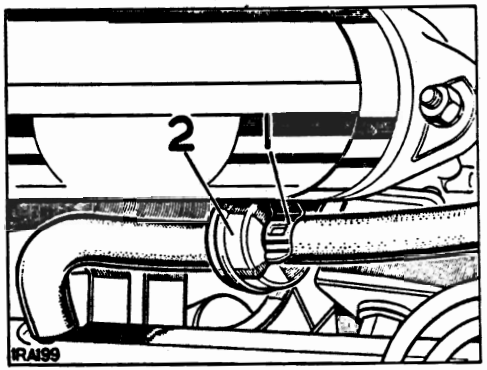


Fig. 42. Engine flame trap, RH illustrated

Engine oil level—Daily or weekly depending on operating conditions and at every maintenance inspection. Fig. 43.

Proceed as follows:

1. Stand the car on level ground and allow the oil to drain back into the sump.
2. Withdraw the dipstick at left-hand side of engine; wipe it clean, re-insert to its full depth and remove a second time to take the reading.
3. Add oil as necessary through the screw-on filler cap marked 'engine oil' on the right-hand front rocker cover. Never fill above the 'High' mark.

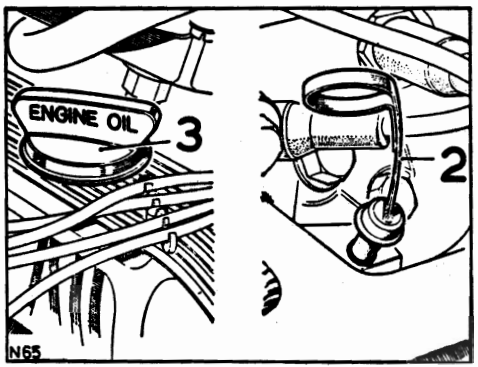


Fig. 43. Engine oil filler cap and oil level dipstick

ENGINE COMPARTMENT

Power steering fluid reservoir, as applicable—At 1.000 km (750 miles) and at every maintenance inspection. Fig. 44.

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

1. Unscrew the fluid reservoir cap.
2. Check that the fluid is up to the mark on the dipstick.
3. If necessary, top up using one of the recommended grades of fluid.

Power steering, as applicable—Every 5.000 km (3,000 miles) or 3 months.

Check power steering for oil leaks at hose connections, oil seals and joint faces on steering unit and power steering pump. Rectify as necessary.

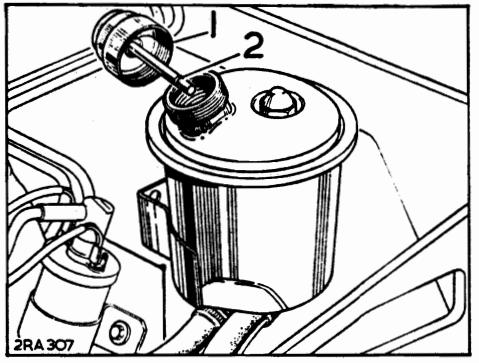
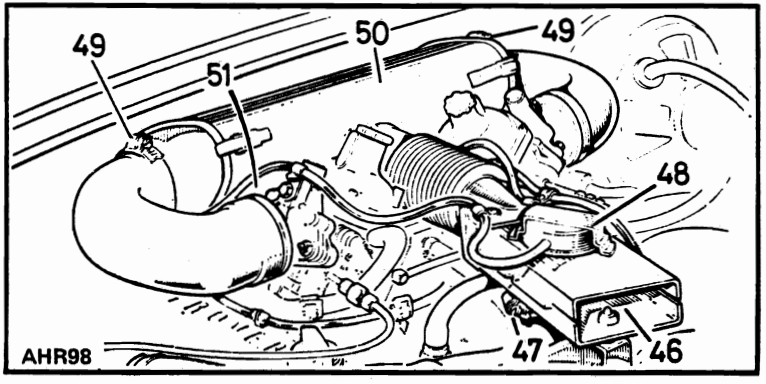


Fig. 44. Power steering fluid reservoir



Range Rover maintenance location points for:

45 Crankcase emission control system
46 Air intake temperature control system
47 Air cleaner and silencer flap valve
48 Air cleaner intake mixing flap valve
49 Air cleaner removal
50 Air cleaner element replacement
51 Breather filter for engine

Crankcase emission control

To comply with current regulations concerning engine emission control, crankcase emissions from the Range Rover V8 engine are vented into the carburetters to be burnt with the fuel/air mixture.

Brief description of the control system—Fig. 45.

1. The breathing cycle is performed by tapping clean air from the rear of the air cleaner, then to the crankcase via a hose and filter.
2. The crankcase fumes rise via the pushrod tubes to the rocker covers where they are then transferred to the carburetters via hoses and flame traps.

   Finally the fumes are drawn into the engine to be burnt with the fuel/air mixture.

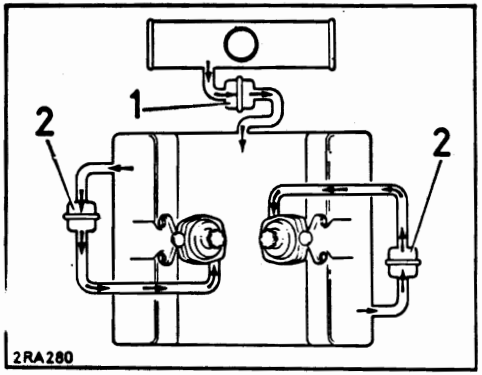


Fig. 45. Diagramatic layout of crankcase emission control system

ENGINE COMPARTMENT

Air intake temperature control—Figs. 46 and 47.

To enable the engine to operate on the most efficient air/fuel ratio, a system is incorporated which is designed to achieve an air intake temperature of 38°C (100°F) as soon as possible and maintain this temperature whilst ambient conditions are below 38°C (100°F).

The system comprises:

1. A hot box surrounding the right-hand exhaust manifold.

2. A vacuum operated thermostatically controlled flap valve in the air cleaner and silencer intake.

3. The flap valve controls the source of the intake air supply which may be warm air drawn entirely from the hot box or cold air drawn from the under bonnet area or a combination of both.

4. The hot box is connected via a hose to the flap valve in the air intake.

5. The temperature sensing device is situated in the air cleaner on the clean side of the right-hand element.

6. A pipe from the manifold is attached to the temperature sensing device via a non-return valve.

7. From the other side of the temperature sensing device is a pipe connecting the vacuum capsule operating the flap valve.

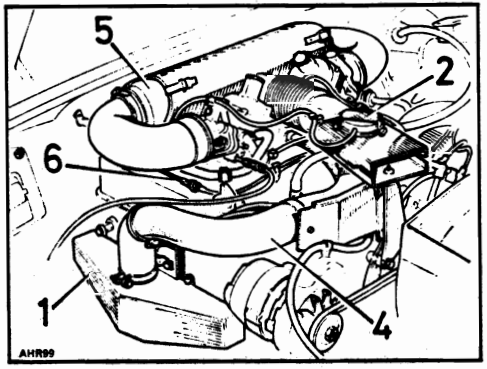


Fig. 46. Layout of air intake temperature control system

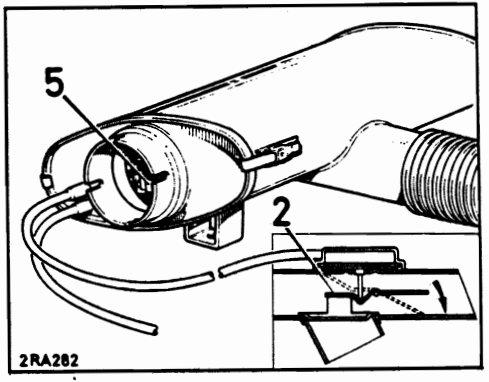


Fig. 47. Layout of air cleaner and silencer flap valve

Air cleaner intake mixing flap valve—Every 20.000 km (12,000 miles) or 12 months. Fig. 48.

1. Check operation of the mixing flap valve in air cleaner by starting up engine from cold and observing the flap valve as the engine temperature rises.
2. The valve should start to open slowly within a few minutes of starting and continue to open until a stabilised position is achieved. This position and the speed of operation will be entirely dependent on prevailing ambient conditions.
3. Failure to operate indicates failure of the flap valve vacuum capsule.
4. Failure of the thermostatically controlled vacuum switch or both.
5. Check by connecting a pipe, shown in dotted line, one end direct from manifold tapping.
6. The other end to the flap valve vacuum capsule, thereby by-passing the air cleaner temperature sensing device.
7. If movement of the flap valve is evident the temperature sensor is faulty. If no movement is detected, the vacuum capsule is faulty. Replace faulty parts.

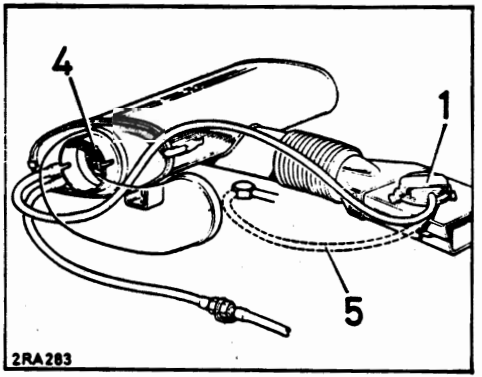


Fig. 48. Checking air cleaner intake mixing flap valve

ENGINE COMPARTMENT

Air cleaner element replacement—Every 20.000 km (12,000 miles) or 12 months. Figs. 49 and 50.

Attention to the air cleaner is extremely important. Replace elements every 10.000 km (6,000 miles) or 6 months under severe dusty conditions, as performance will be seriously affected if the engine is run with an excessive amount of dust or industrial deposits in the elements.

For air cleaner removal proceed as follows:

1. Slacken the clip retaining the advance/retard vacuum pipes from the air intake and release pipes from intake.
2. Slacken the clip retaining hose air cleaner to temperature sensing device from air intake and remove pipe from flap valve on air intake.
3. Slacken the hose clip attaching warm air intake hose to air intake.
4. Withdraw the air intake from the steady post and hoses.
5. Slacken the clips securing the air cleaner elbows and withdraw elbows.
6. Remove the air cleaner from the retaining posts by lifting and easing forward.
7. At the same time disconnect the hose engine breather filter to air cleaner. Place air cleaner to one side.
8. Remove hose with the non-return valve from the manifold.

The air cleaner can now be completely removed.

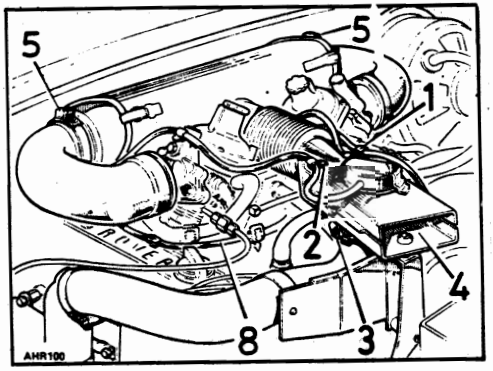


Fig. 49. Air cleaner removal

For air cleaner element replacement:

1. Release the two clips at each side of air cleaner casing and withdraw the frames and elements.
2. To replace the elements remove the screw and washer on the frame carrier.
3. Remove end cap.
4. Remove sealing washers.
5. Discard old elements and replace with new units.
6. Ensure that sealing washers on frame and end cap are in good condition and correctly located.
7. Check condition of rubber seals on end of carrier frame. Replace if necessary.
8. Reassemble elements to air cleaner and air cleaner to engine by reversing the removal procedure as follows:
9. Fit carrier frames in air cleaner casing and secure with the two clips at each side.
10. Reconnect hose with non-return valve to the manifold connection.
11. Place air cleaner on to the retaining posts.
12. At the same time reconnect the breather filter hose to the base of the air cleaner.
13. Refit the air cleaner elbows and tighten clips.
14. Replace air intake on to steady post and reconnect air cleaner and warm air intake hoses. Tighten clip.
15. Reconnect pipe, air cleaner to temperature sensor and vacuum advance/retard pipe to air intake. Position pipes in retaining clips on air intake and tighten clips.

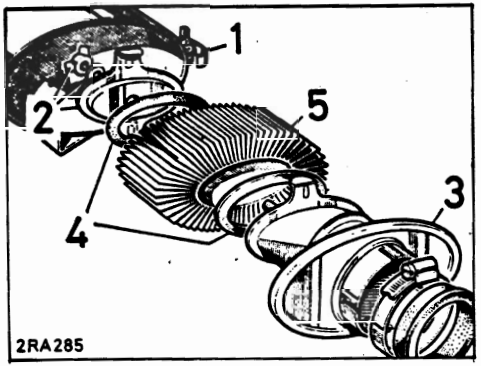


Fig. 50. Air cleaner element replacement

ENGINE COMPARTMENT

Engine breather filter—Every 40.000 km (24,000 miles) or 24 months. Fig. 51.

Replace as follows:

1. Remove the air cleaner as detailed under 'Air cleaner'.
2. Withdraw rear hose from the filter.
3. Slacken the filter clip.
4. Withdraw the filter from the clip and front hose.
5. Fit new filter with end marked 'IN' facing forward. Alternatively, if the filter is marked with arrows, they must point rearwards. Refit hoses and tighten clip.

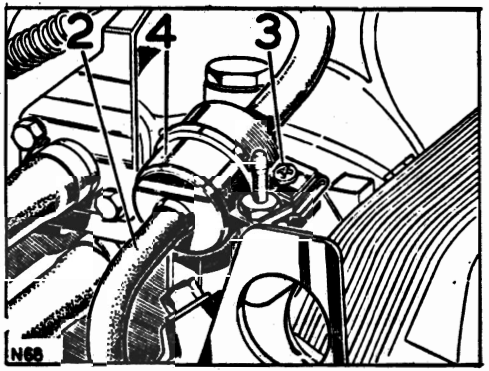
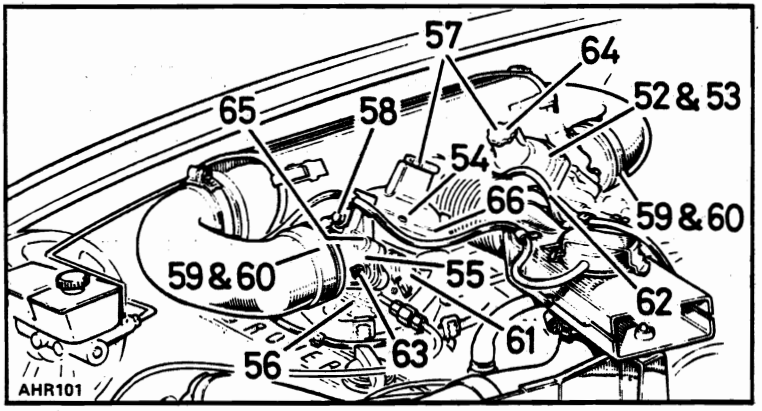


Fig 51. Breather filter for engine

Range Rover maintenance location points for:

52 Throttle butterfly, low manifold depression
53 Throttle butterfly, high manifold depression
54 Cross section view of spring loaded needle
55 Fuel deflector
56 Carburetter temperature compensator
57 Carburetter hydraulic damper
58 Throttle adjusting lever screw
59 } Carburetter balancing device
60 }
61 Throttle adjusting lever and throttle stop screws
62 Throttle lever setting, LH
63 Throttle lever setting, RH
64 Adjuster for setting carburetter mixture
65 Fast idle adjustment
66 Throttle control vacuum switch



Carburetters

1. The carburetters are specially prepared instruments manufactured to extra close tolerances and form a major part of the exhaust emission control equipment.

   To ensure compliance with the exhaust emission control regulations adjustments must be strictly limited to the instructions given in this section. Carburetter mixture and idling speed are accurately set at the factory and should not normally require further adjustment. If for any reason adjustment becomes necessary this should be carried out by a Rover or British Leyland Motor Dealer as special equipment is required.

Carburetter throttle butterfly. Figs. 52 and 53.

2. The throttle butterfly has a spring loaded poppet valve
3. With low manifold depression, Fig. 52, the valve remains closed.
4. At high manifold depression conditions, Fig. 53, that is over-run at closed throttle, the valve opens and prevents incorrect combustion of fuel by supplementing the volume of fuel/air mixture; this together with a vacuum retarded ignition setting maintains correct combustion.

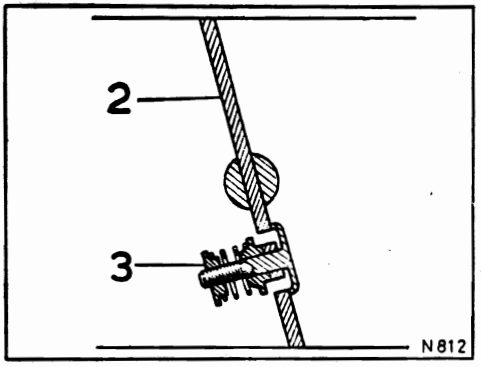


Fig 52. Throttle butterfly, low manifold depression

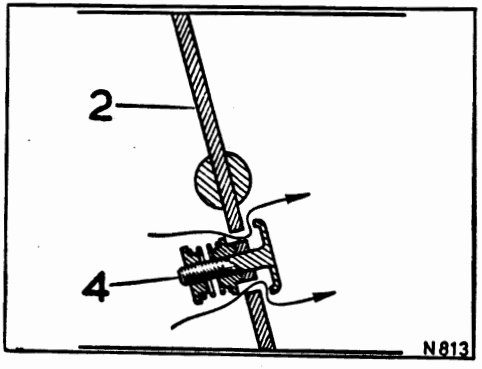


Fig. 53. Throttle butterfly, high manifold depression

Spring loaded carburetter needles—Fig. 54.

1. Each carburetter needle is spring loaded.
2. The needle is biased by the spring against the retainer.
3. This maintains the needle in its correct relationship with the carburetter jet thus improving the control of emission.

Fuel deflector—Fig. 55.

1. A fuel deflector is fitted between the carburetter insulating block and inlet manifold.
2. The deflector takes the form of a sheet of metal pressed out to give a hole with inward facing teeth through which the fuel/air mixture passes and is atomised.
3. The purpose of the teeth is to prevent wet fuel accumulating on the manifold walls and thus allowing the engine to function satisfactorily on leaner mixtures.

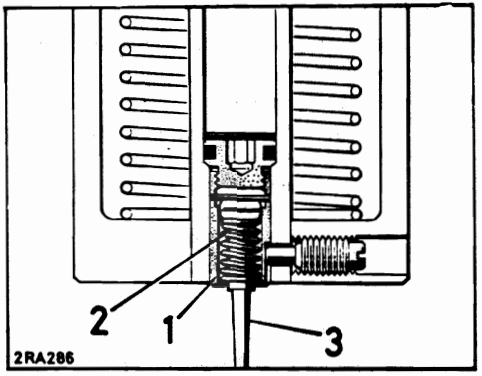


Fig. 54. Cross-section view of spring-loaded needle

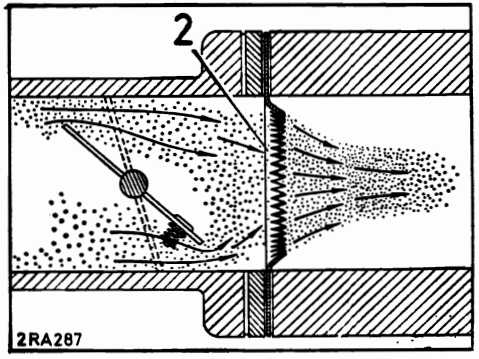


Fig. 55. Fuel deflector

Temperature compensator—Fig. 56.

1. Each carburetter has an integral temperature compensator situated at the side of the carburetter body.
2. Each compensator contains a bi-metallic blade which is sensitive to carburetter body temperature.
3. The bi-metallic blade regulates a pre-set tapered plug and allows an air bleed by-passing the carburetter jet thus giving weaker mixtures at high engine temperatures.
   The system gives sensitive mixture control over a wide range of temperatures.

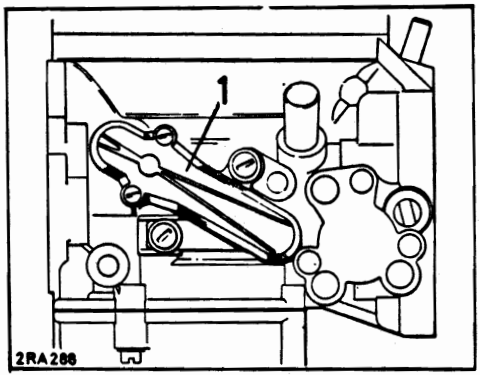


Fig. 56. Carburetter temperature compensator

Accelerator linkage—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months.

1. Prior to carburetter adjustments, lubricate the accelerator linkage using clean engine oil.
2. Check the linkage for correct operation and ensure that there is no tendency to stick. Badly worn parts should be replaced.

Carburetter hydraulic dampers—At free service 1.500 km (1,000 miles and thereafter every 10.000 km (6,000 miles) or 6 months. Fig. 57.

1. Unscrew the cap on top of each suction chamber; withdraw cap and hydraulic damper. Replenish the damper reservoir as necessary with SAE 20 oil to within about 25 mm (1 in.) from the top of the tube.
2. Then replace cap and hydraulic damper.

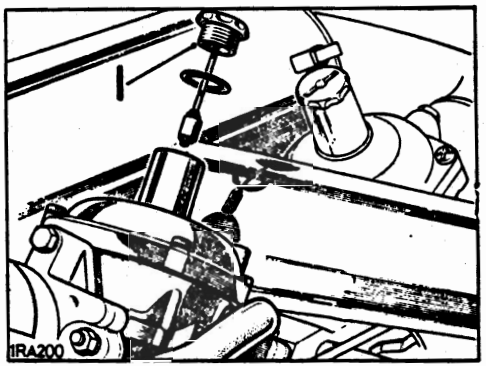


Fig. 57. Carburetter hydraulic damper

ENGINE COMPARTMENT

Carburetter linkages and carburetter adjustments—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months. Figs. 58, 59, 60, 61, 62, and 63.

Carburetter adjustment, if necessary, should be carried out by a Rover or British Leyland Motor Dealer as special equipment is required.

1. Accurate engine speed is essential on emission controlled engines, therefore the contact breaker, dwell angle, ignition timing and automatic ignition advance and retard mechanism should all be checked and reset if necessary before commencing carburetter adjustments.

General requirements when setting carburetters

2. **Temperature.** Whenever possible the ambient air temperature of the setting environment should be between 15.5 to 26.5°C (60° to 80°F).

3. **Vehicle conditions.** Idling adjustments should be carried out on a fully warmed up engine, that is, at least 5 minutes after the thermostat has opened. This should be followed by a run of one minute duration at an engine speed of approximately 2,500 revs/min after which three minutes may be taken in which to check and carry out adjustments; a further one minute run at 2,500 revs/min must be made before further adjustments or checks are carried out. This cycle may be repeated as often as required. It is important that the above cycle is adhered to, otherwise, overheating may result and settings may be incorrect.

4. Before any attempt is made to check settings a thorough check should be carried out to see that the throttle cable between the pedal and carburetters is free and has no tendency to stick. It is also important to ensure that the choke control is fully pushed in.

During carburetter mixture adjustment it is most important that attention is paid to the reading on the exhaust gas analyser ensuring that the CO content does not exceed the requisite 4.5%.

To adjust the carburetters proceed as follows:

1. Run the engine until warm. See note concerning general requirements when setting carburetters.
2. Switch off the engine. Remove the air cleaner as described previously. Plug the disconnected vacuum advance/retard pipe to prevent an air leak into the induction manifold.
3. Slacken the screws securing the throttle adjusting levers on both carburetters thus allowing individual adjustment of each carburetter.
4. Couple an accurate tachometer to the engine following the manufacturers instructions.
5. Check and if necessary zero the gauge on the carburetter balancing device by means of the adjusting screw. Place the balancer on to the carburetter adaptors ensuring that there are no air leaks.

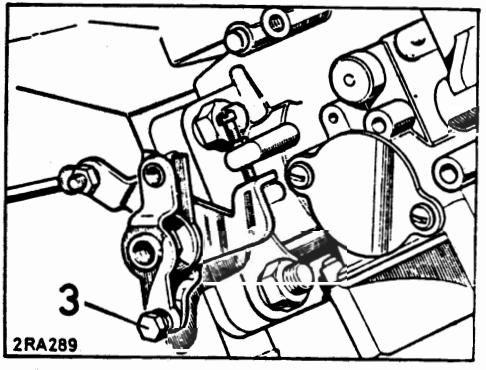


Fig. 58. Throttle adjusting lever screw

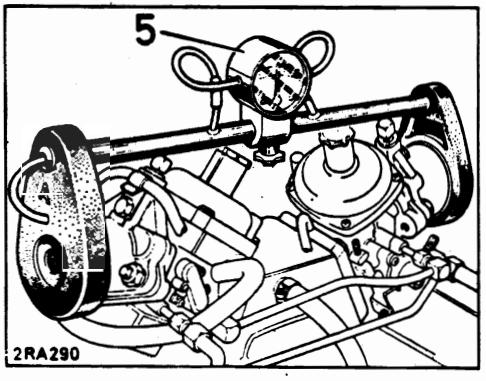


Fig. 59. Carburetter balancing device

6. Start the engine and check the idling speed and air flow balance. If necessary adjust the carburetter throttle stop screws by equal amounts to give an idling speed of 700 to 750 revs/min and an evenly balanced air flow (gauge needle in zero sector).

   If the needle moves to the right decrease the air flow through the left-hand carburetter by unscrewing the idling adjusting screw or increase the air flow through the right-hand carburetter by screwing in the idle adjusting screw.

   Reverse the procedure if the needle moves to the left until the balancer gauge is in the zero sector.

   If the engine speed rises too high or drops too low during balancing adjust to the correct idling speed of 700 to 750 revs/min maintaining the gauge needle in the zero sector by adjusting both throttle stop screws by equal amounts.

   If a synchro-check type of carburetter balancer is employed it will be necessary to balance each carburetter separately. Note the balance gauge reading then repeat the check on the other carburetter. An identical reading must be obtained for both carburetters at the correct idling speed.

   Note. The actual gauge reading is not important only that it is the same for both carburetters. If the gauge readings are not identical then the idle adjusting screws should be adjusted as necessary until the gauge readings are identical.

7. Tighten throttle stop screw locknuts.

8. Switch off the engine.

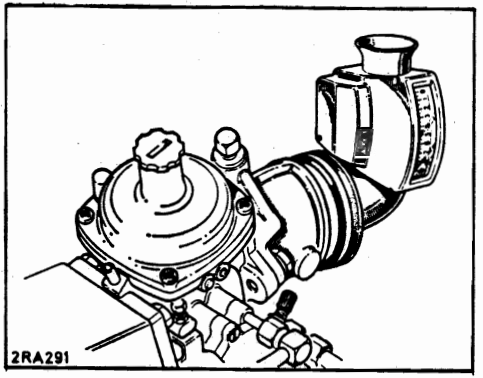


Fig. 60. Syncro-check type of carburetter balancer

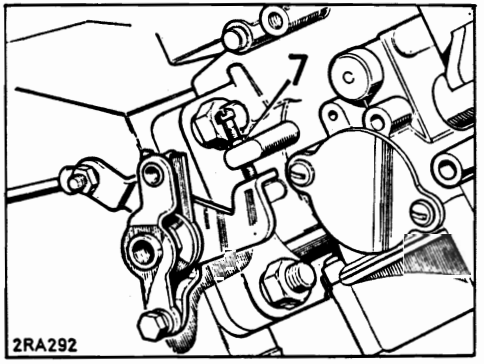


Fig. 61. Throttle adjusting lever and throttle stop screws

9. On the left-hand carburetter place a 0,15 mm (0.006 in.) feeler between the underside of the roller on the countershaft lever, and the throttle lever.
10. Apply light pressure to the throttle lever to hold the feeler.
11. Then tighten the throttle adjusting lever screw and withdraw feeler.
12. On the right-hand carburetter place a 0,15 mm (0.006 in.) feeler between the left leg of the fork on the adjusting lever and the pin on the throttle lever.
13. Apply light pressure to the linkage to hold feeler.
14. Then tighten the throttle adjusting lever screw and withdraw feeler.
15. Replace air cleaner.

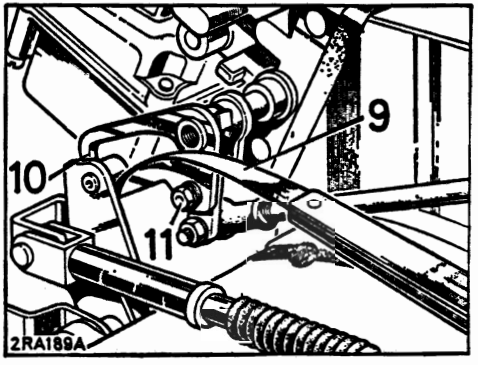


Fig. 62. Throttle lever setting, LH

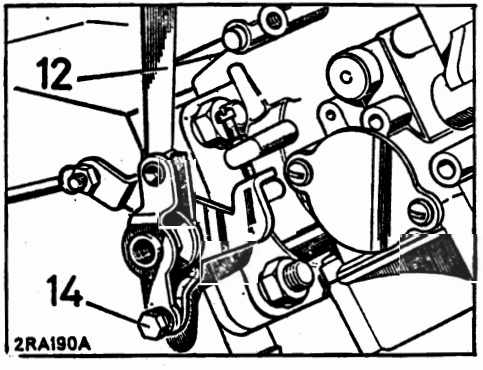


Fig. 63. Throttle lever setting, RH.

Mixture adjustment—At free service 1.500 km (1,000 miles) only. Fig 64. Mixture adjustment is pre-set and under normal circumstances should not require attention. However adjustment may be necessary after the in tial running in period.

It is most important that during mixture adjustment attention is paid to the reading of the exhaust gas analyser ensuring that the CO content does not exceed the requisite 4.5%.

The mixture is controlled by adjustment of the jet orifice screw, either clockwise or anti-clockwise to enrich or weaken the mixture as required, using a special adjuster tool. See Fig. 64.

For mixture adjustment proceed as follows:

1. Connect a suitable exhaust gas analyser to the exhaust system following the manufacturer's instructions.
2. Run the engine until warm. Ensure that it is idling at 700 to 750 revs/min.
3. Locate the adjuster in the slots at the base of the jet assembly on one of the carburetters.

   Turn the adjuster a fraction of a turn in the required direction, clockwise to enrich the mixture, anti-clockwise to weaken. It is important that only small adjustments are made at a time until even running is obtained.

   Note. During adjustment careful observation should be maintained on the exhaust gas analyser, readings should not exceed 4.5% upon completion of adjustments to ensure that exhaust emission regulations are not contravened.

   After each adjustment and before taking a CO meter reading the throttle should be opened to increase engine speed to approximately 2,500 revs/min for a short period to enable carburetter pistons to settle in their normal running position.

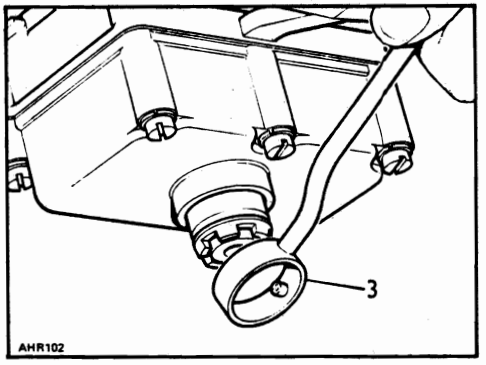


Fig. 64. Adjuster for setting carburetter mixture

4. Remove the adjuster.
5. Check the engine for even running and an idling speed of 700 to 750 revs/min. If necessary repeat the above operation on each carburetter making only fractional adjustments at a time exactly the same for each carburetter.

   In each case after adjustment recheck the idling speed and CO meter reading.

   During mixture adjustment the engine may have a tendency to stall in which case it should be allowed to recover its idling speed between each fractional movement of the adjuster.
6. Switch off the engine and remove the tachometer.

Fast idle adjustment—Fig. 65.

The fast idle adjustment is pre-set on the left-hand carburetter and should not normally require adjustment. If adjustment becomes necessary for any reason the correct procedure entails the removal of the left-hand carburetter. This operation together with the following method of setting the fast idle should be entrusted to a British Leyland Motor Dealer. After removal of the carburetter proceed as follows:

1. Set the cold start spring loaded pin fully outward.
2. Slacken the locknut on the fast idle adjustment screw.
3. Hold the cold start cam lever in the maximum open position.
4. Adjust the fast idle adjustment screw against the cam lever until there is a 0,80 mm (0.032 in.) gap between the top edge of the throttle butterfly and the carburetter barrel wall.
5. Secure the locknut on the fast idle adjusting screw without disturbing the adjustment.
6. Refit the carburetter.
7. Start the engine and run until normal temperature is attained. Pull out the cold start control until the cold start warning light comes on. Then push in the control until the warning light just goes out (approximately 12,7 mm (0.5 in.) from the fully in position).
8. Check with an accurate tachometer that the engine speed is between 1,150 and 1,250 revs/min. If necessary adjust the fast idle adjusting screw to obtain this figure. Finally tune and adjust the carburetters as previously described.

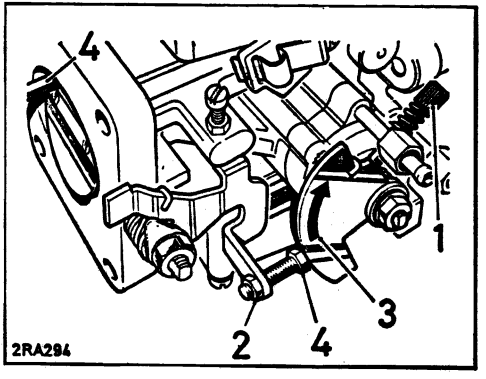


Fig. 65. Fast idle adjustment

Cold start control

To obtain maximum starting efficiency it is recommended that for summer and winter use the cold start control is pulled fully out to start the engine. The control should then be progressively pushed in, consistent with even running, until fully pushed in.

Throttle control vacuum switch—Check clearance with throttle cam every 10.000 km (6,000 miles) or 6 months. Fig. 66.

The following check and adjustment must only be carried out after the engine idle speed has been set correctly. See page 94.

The vacuum switch is activated by a cam fitted to the left-hand carburetter spindle and is set to interrupt the vacuum line between the manifold and the retard side of the distributor vacuum unit.

The vacuum switch enables normal advance characteristics to be obtained for quick acceleration, high speed driving and vehicle laden conditions.

To check and adjust switch position.

1. Ensure that the throttle linkage is fully in the idle position.
2. Push the plunger fully into the switch and hold in this position.
3. Measure the clearance between the plunger and the cam on the throttle linkage. This must be 0,8 to 1,0 mm (0.035 to 0.040 in.).
4. Adjust as necessary by slackening the fixings mounting the switch to the bracket and moving the switch in the required direction.
5. Recheck the clearance after adjustment to ensure that it has not been disturbed when tightening the fixings.

   Note. After final adjustment ensure that the centre of the cam contacts the centre of the switch button.

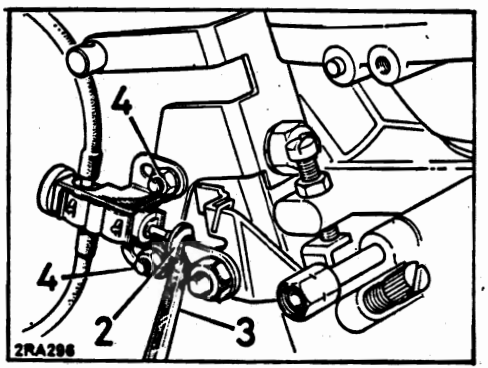


Fig. 66. Checking switch position

ROAD TEST AND PREVENTIVE MAINTENANCE

Road test—At free service 1.500 km (1,000 miles) and thereafter every 10.000 km (6,000 miles) or 6 months.

Give the vehicle a thorough road test and carry out any further adjustments required.

Check operation of all instruments and warning lights in facia panel.

After test, check for oil, fuel, fluid or grease leaks at all plugs, flanges, joints and unions.

Ensure that controls, door handles, steering wheel, etc. are clean and free from grease.

Preventive maintenance

1. Preventive maintenance is. in addition to routine maintenance, and consists of the replacement, or overhaul, of hydraulic components incorporated in the braking system at scheduled periods, in order that brake performance is maintained at peak efficiency.

Hydraulic fluid—Every 30.000 km (18,000 miles) or 18 months.

2. All brake fluid absorbs moisture from the air, and as a result its boiling point is lowered with a consequent deterioration in performance. In the sealed brake system, water absorption takes place over a period and can, if not remedied, reduce brake performance to a dangerous level.

All the fluid in the brake system should be changed every 30.000 km (18,000 miles) or eighteen months. It should also be changed before touring in mountainous areas if not done in the previous nine months. Use only Lockheed Brake and Clutch Fluid Specification, current 329S and US Federal Standard 116 from sealed tins. Never use fluid which has been left in an unsealed tin, or re-use fluid already drained.

Rubber seals in brake system—Every 60.000 km (36,000 miles) or every three years, whichever occurs first.

3. Renew all rubber seals in complete brake system and all brake hydraulic hoses. Drain the brake fluid reservoir and flush the system. Refill with the correct fluid, that is, Lockheed Brake and Clutch Fluid Specification current 329S and US Federal Standard 116 from sealed tins.

The above work must be carried out by a Rover Distributor or Dealer.

Bleeding the brake system—Figs. 67 and 68.

If the brakes feel spongy, this may be caused by air in the hydraulic system. This air must be removed by bleeding the hydraulic system at the disc cylinders; one bleed point at each side on the rear, and three at each side on the front.

The following additional points should be noted when bleeding the dual system. Varying brake pedal travel will be experienced depending upon the degree of bleeding required. Bleeding the primary system, that is, both rear brakes and half the front brakes with the secondary system fully operational, almost full brake pedal travel can be used. When bleeding the secondary system, that is, half the front brakes only, with the primary system fully operational, approximately half the total brake pedal travel can be used.

Important: If bleeding the secondary system only, commence with the front caliper **furthest** from the master cylinder, and bleed from the screw on the same side as the fluid inlet pipes, then close the screw, and bleed from the screw on the opposite side on the same caliper. Repeat for the other front caliper.

An advantage with the dual system is the ability to change brake components without having to bleed both systems. The only requirement to bleed the complete system is following the removal and refitting of the servo unit, the pressure failure switch, or complete disconnection and reconnection of the pipes.

To bleed the complete system, proceed as follows:

1. Attach a length of rubber tubing to the bleed screw on the rear left-hand caliper and place the lower end of the tube in a glass jar containing brake fluid.
2. Slacken the bleed screw.
3. When the fluid appears in the jar, commence pumping the brake pedal slowly; pause at least five seconds at each end of the return stroke to allow the master cylinder piston to recuperate. Continue pumping until the fluid issuing from the tube shows no signs of air bubbles when the tube is held below the surface of the fluid in the jar.
4. Hold the tube under the fluid surface, and with the foot brake fully depressed, tighten the bleed screw and replace the dust cap.
5. Repeat this procedure for the rear right-hand caliper.
6. Attach a bleed tube to the primary bleed screw on the front caliper **furthest away** from the master cylinder.
7. Attach a second bleed tube to the secondary bleed screw on the same side of the caliper as the primary bleed screw, using two separate bleed jars.
8. Slacken both bleed screws.
9. When the fluid appears in the bleed jars, commence pumping the brake pedal slowly, pausing at each end of the return stroke, to allow the piston to recuperate, until fluid being expelled is free of air in both jars.
10. Hold the tubes under the fluid surface and with the brake pedal fully depressed, tighten both bleed screws and replace both dust caps.
11. Attach a bleed tube to the remaining secondary bleed screw on the same caliper.

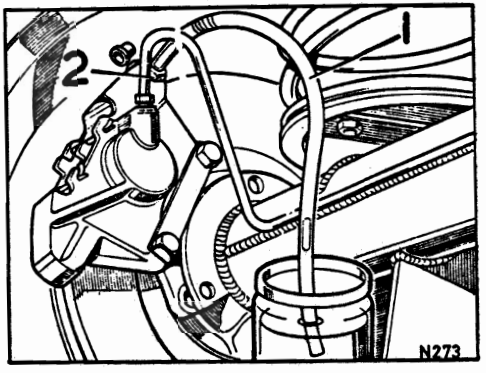


Fig. 67. Rear brake bleed screw

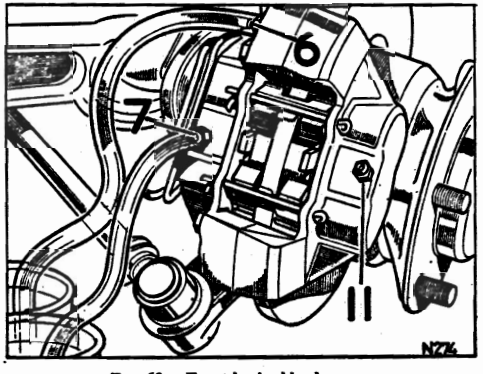
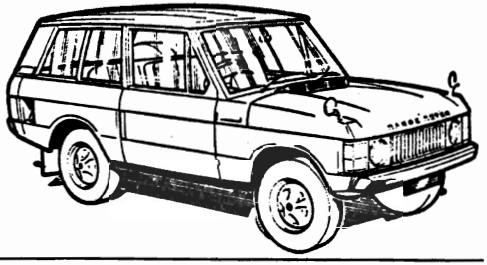


Fig. 68. Front brake bleed screws

12. Slacken the bleed screw.
13. When the fluid appears in the jar commence pumping the brake pedal slowly, pausing at each end of the return stroke, to allow the piston to recuperate, until all air is expelled. Hold the tube under the fluid surface and with the brake pedal fully depressed, tighten the bleed screw and replace dust cap.
14. Repeat this procedure for the front caliper **nearest** to the master cylinder.
15. The fluid in the reservoir should be replenished throughout the operation to prevent another air lock being formed, using only new fluid. Lockheed Brake and Clutch Fluid Specification, current 329S and US Federal Standard 116 from sealed tins.
16. It will be obvious that the above operation requires two people.

Bulb Changing and Wheel Changing



7

BULB CHANGING

This section of the book gives details of headlamp light unit and bulb changing, wheel changing and jacking, etc.

Headlamps—Fig. 69.

To replace light unit:

1. Remove top and bottom retaining screws and washers securing headlamp surround to body.
2. Ease surround forward and remove light unit adaptor.
3. Remove the two adjusting screws to separate the lamp unit from the surround.
4. Remove sealing rubber.
5. Separate lamp unit from rim by slackening the three self-tapping retaining screws and turn lamp unit in an anti-clockwise direction.
6. Fit new lamp unit to rim and reverse removal procedure.
   As soon as possible after the lamp unit has been replaced, it should be adjusted correctly, using specialised equipment, by your Rover Distributor or Dealer.

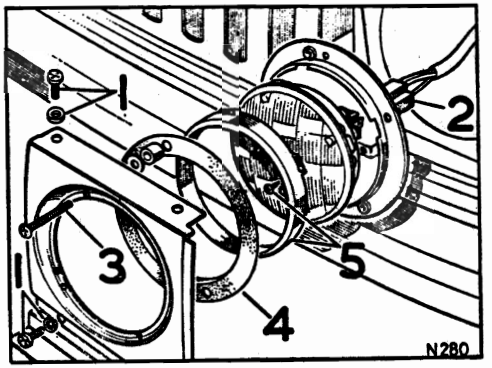


Fig. 69. Headlamp light unit replacement

Side lamps—Fig. 70.

To replace side and flasher lamp bulbs:

1. Remove four posi-drive screws securing lens.
2. Withdraw lens and sealing rubber.
3. Replace bulb: top-flasher lamp bulb, bottom-side lamp bulb.
4. Refit lens and sealing washer; do not overtighten screws.

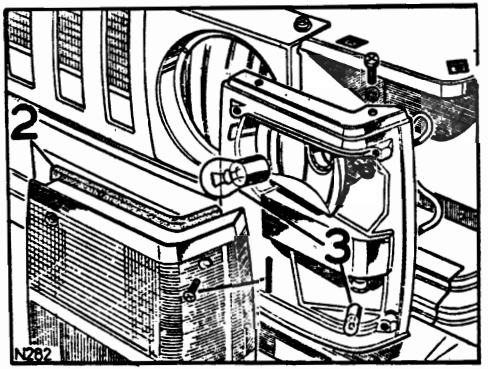


Fig. 70. Side and flasher lamp bulb replacement

Rear lamps—Fig. 71.

To replace flasher, tail, reverse lamp bulbs

1. Remove six screws retaining lens.
2. Remove lens and sealing rubber.
3. Replace bulb: top, flasher lamp bulb.
4. Centre, reverse lamp bulb.
5. Bottom, tail-stop lamp bulb.
6. Refit lens; do not overtighten screws.

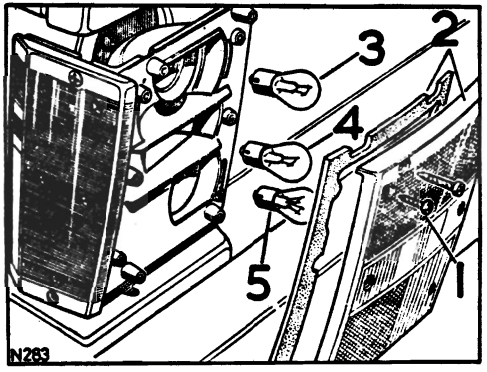


Fig. 71. Rear lamps, bulb replacement

Number plate illumination lamp—Fig. 72.

To replace number plate illumination bulb:

1. Remove two screws retaining lens hood.
2. Remove lens and sealing rubber.
3. Replace bulb as required.
4. Refit lens and sealing rubber.

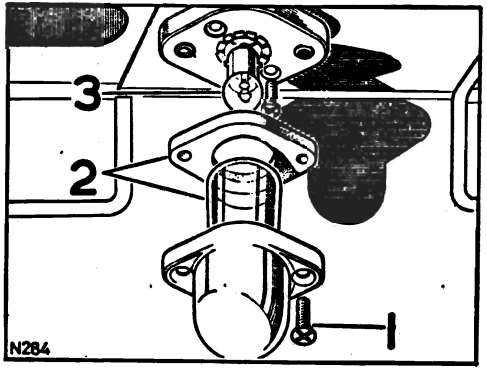


Fig. 72. Number plate illumination lamp

BULB CHANGING

Differential lock warning light—Fig. 73.

To replace differential lock switch warning light bulb:

1. Ease cover complete with bulb and bulb holder from the facia.
2. Withdraw the bulb holder from the cover and remove bayonet type bulb.
3. Renew bulb, replace bulb holder into the cover and replace cover. The cover is located in position by two small 'pips'.

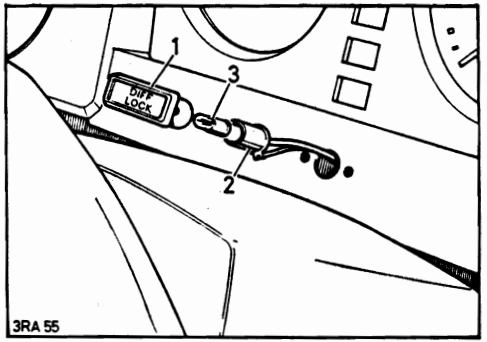


Fig. 73. Differential lock switch illumination

Interior roof lamp—Fig. 74.

Circular lamp at centre of roof:

1. Turn lens anti-clockwise and withdraw.
2. Replace bulb(s).
3. Refit lens.

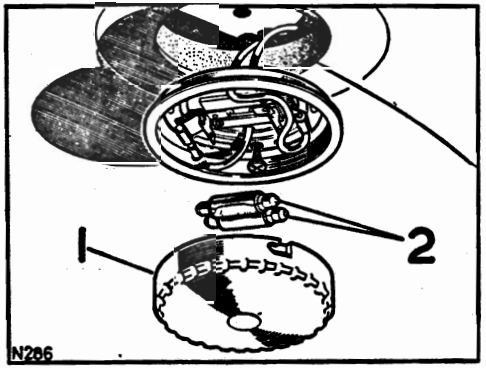


Fig. 74. Interior roof lamp

Warning and panel lights—Figs. 75 and 76.

To replace any of the warning light bulbs:

1. Release the instrument binnacle by pressing inwards with fingers at the bottom rear edge.
2. Lift binnacle over retaining clips.
3. Ease binnacle to one side for access to bulb holders.
4. Change bulb as required by pulling the bulb holder from its socket.
5. Replace bulb and reverse removal procedure. Eleven bulbs are fitted to the instrument panel.

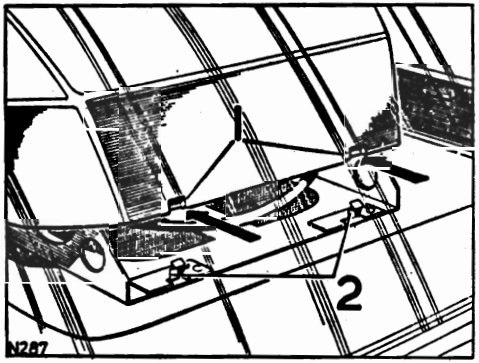


Fig. 75. Instrument binnacle

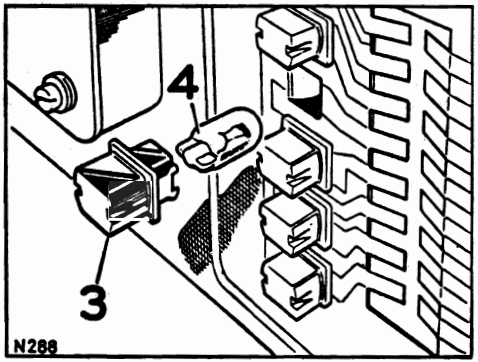


Fig. 76. Warning lights, bulb replacement

BULB CHANGING

Hazard warning light and heated rear screen switch—Fig. 77.

To replace hazard switch or heated rear screen switch warning light bulb:

1. Unscrew knob from switch.
2. Bulb can now be withdrawn and new bulb fitted.
3. When replacing knob, ensure that spring retaining the bulb is correctly positioned in the knob as illustrated.

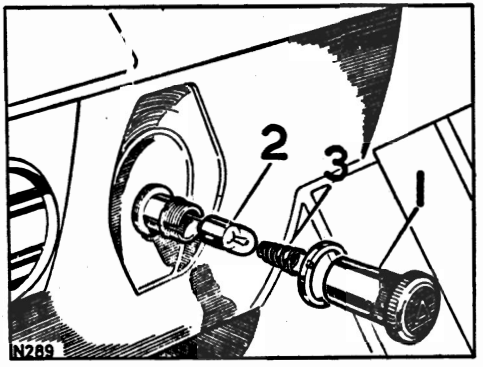


Fig. 77. Hazard warning light switch bulb replacement illustrated

Fuses—Fig. 78.

The fuse box is located under the bonnet on the left-hand bulkhead, adjacent to the windscreen washer bottle.

To replace fuse:

1. Pull off fuse box cover.
2. Replace fuse as required.
3. Two spare 35-amp fuses are clipped into the fuse box.

IMPORTANT

To ensure that regulations existing in certain countries concerning the hazard warning system are not contravened, it is most important that in the event of the 'Battery-Auxiliaries' fuse blowing for any reason, it is not removed and discarded until a replacement fuse can be obtained and fitted.

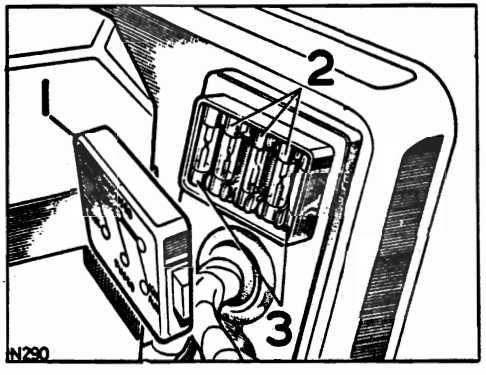


Fig. 78. Fuse box

Circuit diagrams

Circuit diagram will be found at the end of the Data section on page 126.

Clock and bulb removal and clock adjustment—Figs. 79 and 80.

1. Disconnect the battery.
2. Remove the grub screws retaining the four heater control knobs to levers, and remove knobs.
3. Remove the two screws securing the heater escutcheon plate, and remove plate.
4. Remove the four upper retaining screws securing the heater console to the facia panel.
5. Remove the centre face level louvre.
6. Lower the passenger glove box lid.
7. Remove the lower screw securing the heater console.
8. Ease the console forward to gain access to the clock.
9. Remove the feed wire at the '+' Lucar connector.
10. Remove the earth wire from the '—' Lucar connector.
11. Remove the clock illumination lead.
12. Remove the knurled nut and support arm securing the clock to the console and remove clock.
13. Replace bulb if required by pulling bulb and holder from clock.
14. Regulate the clock by means of the screw adjuster on the rear.
    Clock gaining, turn screw to the — mark.
    Clock losing, turn screw to the + mark.
    This regulation should be attempted only if the clock gains or loses more than two or three minutes per week.
15. Replace clock and heater console by reversal of the removal procedure. Set clock hands by pressing and rotating knob on clock face.
16. Reconnect battery.

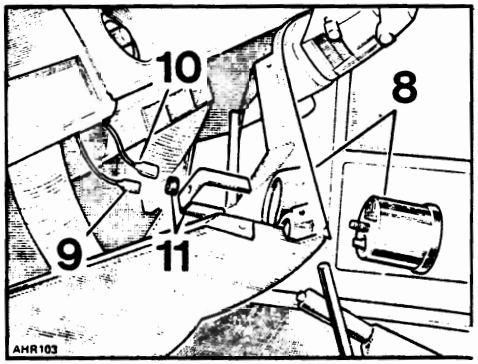


Fig. 79. Clock removal

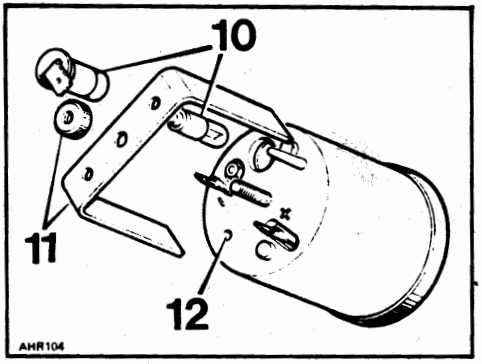


Fig. 80. Clock adjustment

WHEEL CHANGING

Jacking the vehicle. Figs. 81 and 82.

Jacking procedure for the Range Rover is as follows:

Wheels should be chocked in all circumstances.

1. On level or sloping ground, the gearbox differential lock should be engaged prior to stopping the engine and parking the vehicle.
2. The differential lock is only engaged if the warning light is illuminated with the ignition switched on.
3. If the vehicle has been stationary prior to the jacking operation, the differential lock may not operate when the switch is raised. In this case it will be necessary to start the engine, to create a vacuum and, perhaps drive the vehicle, until the warning light is illuminated. Then switch off engine.
4. Apply the handbrake.

Explanatory note: Owing to the fact that the vehicle is fitted with a transmission handbrake, this will not be operative if the differential lock has not been engaged and one or both rear wheels are jacked up, whilst either gearbox is in neutral. Therefore, to obtain engine braking, both gearboxes should be engaged in 1st gear and 'low' transfer respectively.

The design of the transmission is such that jacking up the rear wheels, whilst on a slope, even with the differential lock engaged, could result in limited vehicle movement as a result of the 'back-lash' in the transmission.

The handbrake is operative within transmission back-lash limits, if the rear wheels are to stay on the ground and one or both front wheels are jacked up, irrespective of the gearbox differential lock engagement. **Therefore always chock wheels.**

To jack up a front wheel: 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, see Fig. 81.

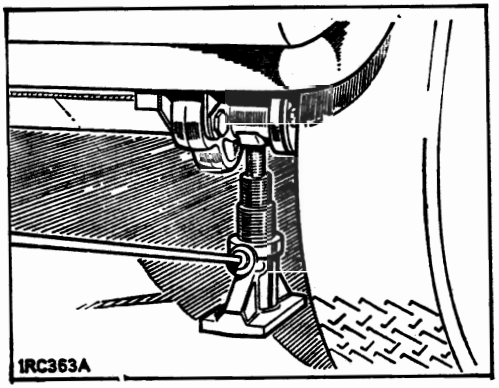


Fig. 81. Correct position for jack, front

To jack up a rear wheel: 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, see Fig. 82.

Warning: It is unsafe to work under the vehicle using only the jack to support it. Always use 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.

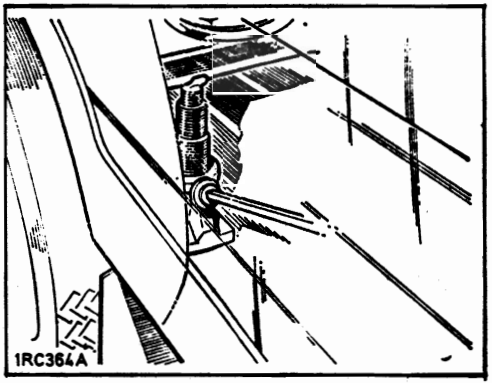


Fig. 82. Correct position for jack, rear

Wheel changing—Fig. 83.

1. Slacken the five wheel nuts.
2. Jack up corner of the vehicle—see previous page; jacking the vehicle.
3. Remove the nuts and gently withdraw the wheel over the studs.
4. If available, place a drop of oil or grease on the wheel studs to assist in replacement.
5. Fit spare wheel; tighten the nuts as much as possible; lower the vehicle to ground and finally tighten the nuts to a torque figure of between 10,0 and 11,7 kgf. m (75 and 85 lbf. ft).

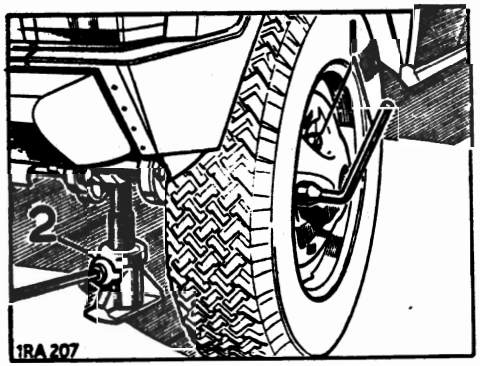


Fig. 83. Wheel changing, front illustrated

SPARE WHEEL REMOVAL AND BODY CARE

Spare wheel removal—Fig. 84.

To remove spare wheel from mounting:

1. Unscrew locking lever securing clamping plate and spare wheel, and remove.
2. Remove clamping plate.
3. Remove spare wheel.

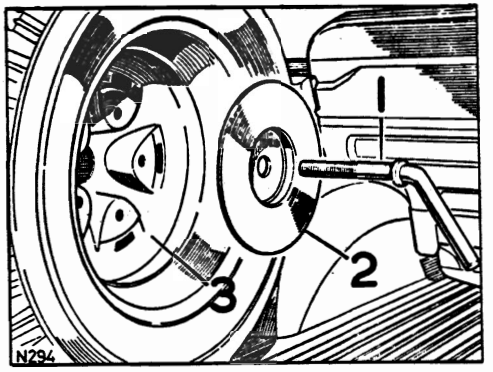


Fig. 84. Spare wheel removal

Body care

It is always preferable to clean the bodywork trim with water and sponge, using plenty of water; wherever possible the surface should be freely hosed. After drying with a chamois leather, polish in the usual manner, using any of the good brands of wax car polish.

The use of salt on the roads during frosty weather, sometimes in quite strong concentrations, is now being widely practised. Due to its highly corrosive nature, salt deposited should be washed off as soon as possible by thorough under-washing of the vehicle.

To clean the seats, use a damp cloth with a little mild soap. Do not use detergents on the seats.

Vinyl covered rear quarter panels

Wash the vinyl surface over with warm soapy water (use soap flakes or mild tablet soap). If dirt is ingrained the use of a soft nail brush will help. Rinse off with clean cold water ensuring that all soap is removed. During normal cleaning of the car the vinyl will not be affected by mild detergents such as are used in Automobile Car Washes. Avoid the use of wax polish, creams, solvents or strong detergents. Under no circumstances should White Spirit or Petrol be used to remove oil or grease marks from the vinyl surface.

General Data, Circuit Diagrams, Maintenance Schedules and Index

8

GENERAL DATA

Engine

Type	V8
Bore	88,90 mm (3.500 in.)
Stroke	71,12 mm (2.800 in.)
Number of cylinders	Eight
Cylinder capacity	3528 cc (215 cu in.).
Compression ratio	8.25:1
BHP	156 (116 kw) at 5,000 revs/min.
Maximum torque	28,3 kgm (205 lb ft) at 3,000 revs/min.
BMEP	10,12 kg/cm² (144 lb sq in.) at 3,000 revs/min.

BHP, maximum torque and BMEP figures are derived from bench tests and do not allow for installation losses in the vehicle

Firing order	1, 8, 4, 3, 6, 5, 7, 2
Sparking plugs	Champion L92Y 14 mm with suppressed leads
Sparking plug point gap	0,60 mm (0.025 in.)
Distributor contact breaker gap	Dwell angle 26°–28°. See also Distributor contact points, page 74
Ignition timing, dynamic at 600 revs/min.	5° ATDC mark on crankshaft pulley—using 91–93 octane fuel—2-star rating in the UK 8° ATDC mark on crankshaft pulley—using 85-91 octane fuel
Oil pressure	2,11 to 2,81 kg/cm² (30 to 40 lb sq in.) at 80 kph (50 mph) in top gear with engine warm (2,400 revs/min.)
Lubrication	Full pressure
Oil filter—internal	Gauze pump intake filter in sump
Oil filter—external	Full-flow

Clutch

Type	Diaphragm spring single dry plate 267 mm (10.5 in.) hydraulic hydrostatic operation
Fluid	Lockheed Brake and Clutch Fluid Specification current 329S and US Federal Standard 116

Main gearbox

Type	Single helical constant mesh with syncromesh on all forward gears

Transfer box

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

Gear ratios

Main gearbox: Top	Direct	
Third	1.505:1	
Second	2.448:1	
First	4.069:1	
Reverse	3.664:1	
Transfer gearbox High	1.174:1	
Low	3.321:1	
Overall ratio (final drive):	In high transfer	In low transfer
Top	4.16:1	11.76:1
Third	6.25:1	17.69:1
Second	10.17:1	28.78:1
First	16.91:1	47.83:1
Reverse	15.23:1	43.07:1

Rear axle

Type	Spiral bevel, fully floating shafts
Ratio	3.54:1

Front axle

Type	Spiral bevel, enclosed universal joints
Angularity of universal joint on full lock	33°
Ratio	3.54:1

GENERAL DATA

Propeller shafts

Type	Open-type, 51 mm (2 in.) diameter, 1310-type universal joints, wide angle variety on front shaft only. Gaiter fitted to sliding coupling of front shaft

Fuel system

Fuel pump	Bendix electrical
Carburetter	Twin Zenith Stromberg type 175 CD-SE
Needle size	B2AS
Air cleaner	Twin paper element type
Idle speed	700-750 revs/min
Mixture setting	4.5% maximum at idling speed

Cooling system

Type	Pump, fan and thermostat, pressurised to 1,05 kg/cm² (15 lb sq in.).
Thermostat, wax type	Starts to open at 85°C (185°F) nominal
Fan belt adjustment	11 to 14 mm (0.437 to 0.562 in.) free movement

Electrical system

Type	Negative earth
Voltage	12 volt
Battery capacity	58 AH at 20 hour rate
Ignition system	Coil, 7 volt ballasted, Lucas BA 16C6
Charging circuit	18ACR battery sensed alternator with transistorised current-voltage regulator, output 45 amp
Hazard warning	Switch on dash operates all flashers together
Fuses	35 amp blow rating

Hydraulic dampers	Telescopic double acting non-adjustable 35 mm (1.375 in.) bore

Brakes

Foot brake	Front: Outboard disc brakes with four pistons, Disc diameter 298 mm (11.75 in.); Rear: Outboard disc brakes with two pistons, Disc diameter 290 mm (11.42 in.) — Hydraulic servo-assisted self-adjusting
Total pad area	317,34 cm² (49.2 sq in.)
Total swept area	3199,2 cm² (496 sq in.)
Handbrake	Mechanical 184 mm (7.25 in.) diameter, 76 mm (3 in.) width duo-servo drum brake on rear of transfer box output shaft
Fluid	Lockheed Brake and Clutch Fluid Specification current 329S and US Federal Standard 116

Steering

Type	'Burman' recirculating ball, worm and nut
Ratio	Variable: Straight ahead 20.55:1. Full lock 25.5:1, 4.75 turns lock to lock
Front wheel alignment	1,2 to 2.4 mm (0.046 to 0.093 in.) toe-out
Camber angle	0° — Check with vehicle in static unladen condition. That is, vehicle with water, oil and 5 gallons of fuel. Rock the vehicle up and down at the front to allow it to take up a static position
Castor angle	3°
Swivel pin inclination	7°
Steering wheel	Three-spoke: 432 mm (17 in.) diameter

GENERAL DATA

Tyres

Sizes .. .. 205 x 16 Radial ply, Michelin M+S or Firestone Town and Country (tubed)

See your Rover Distributor or Dealer for the type of tyre currently recommended

Pressures: Check with tyres cold

Normal on- and off-road use

	All speeds and loads up to 226 kg (500 lbs)		All speeds and loads above 226 kg (500 lbs)	
	Front	Rear	Front	Rear
kg/cm²	1,8	1,8	1,8	2,5
lb sq in.	25	25	25	35
bars	1,72	1,72	1,72	2,4

Off-road 'emergency soft' use

	Loads up to 226 kg (500 lbs) maximum speed of 64 kph (40 mph)		Loads above 226 kg (500 lbs) maximum speed of 64 kph (40 mph)	
	Front	Rear	Front	Rear
kg/cm²	1,1	1,1	1,1	1,8
lb/sq in.	15	15	15	25
bars	1,03	1,03	1,03	1,72

As soon as reasonable conditions are reached, pressures should be restored to the normal 'on and off-road' use as above.

When high speed touring the tyre pressures should be checked much more frequently, even to the extent of a daily check.

Replacement headlamp units and bulbs

Headlamps	Butlers 1697/4DE, 75/50w	Exterior lamps
Sidelamps	Lucas No. 233, 12v, 4w	
Stop/tail lamps	Lucas No. 380, 12v, 6/21w	
Reverse lamps	Lucas No. 382, 12v, 21w	
Direction indicator lamps	Lucas No. 382, 12v, 21w	
Number plate lamps	Lucas No. 233, 12v, 4w	
Instrument panel lamps and warning lamps	Smith No. 4062110974, 12v, 2.2w capless	Interior lamps
Hazard warning switch lamp	Lucas No. 281, 12v, 2w	
Interior roof lamp 'festoon bulbs'	Lucas No. 585, 12v, 10w	
Differential lock warning lamp	Lucas No. 987, 12v, 2.2w	
Clock illumination	Lucas No. 281, 12v, 2w	

Suspension

Front	Coil springs, radius arms and panhard rod. Spring rate: 23,75 kg/cm (133 lb in.)
Rear	Coil springs, radius arms, 'A' frame location arms with 'Boge' hydromat self-energising levelling device. Spring rate: 23,0 kg/cm (130 lb in.)

Dimensions

Overall length	4,47 m (176 in.)
Overall width	1,78 m (70 in.)
Overall height	1,78 m (70 in.)
Wheelbase	2,54 m (100 in.)
Track: front and rear	1,48 m (58.5 in.)
Ground clearance; under differential	190 mm (7.5 in.)
Turning circle	11,28 m (37 ft)
Loading height	660 mm (26 in.)
Maximum cargo height	1,04 m (41 in.)
Rear opening height	1,04 m (41 in.)
Usable luggage capacity, rear seat folded	1,67 cu m (59 cu ft)
Usable luggage capacity, rear seat in use	1,24 cu m (43.9 cu ft)
Vehicle weight: fully laden	2.404 kg (5,300 lb)
Kerb weight, with water, oil and 22,5 litres (5 gals) of fuel	1.724 kg (3,800 lb)
Maximum vehicle payload:	680 kg (1,500 lb)
that is:	
5 persons plus	340 kg (750 lb) } Both on and off the road
2 persons plus	544 kg (1,200 lb) } including auxiliary equipment

Maximum towing weight:	Trailer weight	Trailer plus vehicle weight
Off-road trailer	1.000 kg (2,205 lb)	3.504 kg (7,725 lb)
Road trailer with power brakes	4.000 kg (8,818 lb)	6.504 kg (14,338 lb)

Maximum roof rack load 50 kg (112 lbs)

Note. It is the Owner's responsibility to ensure that all regulations with regard to towing are complied with. This applies also when towing abroad. All relevant information should be obtained from the appropriate motoring organisation.

Capacities

Component	Litres	Imperial unit	US unit
Engine sump oil	5,1	9 pints	10.5 pints
Extra when refilling after fitting new filter	0,56	1 pint	1.25 pints
Main gearbox oil	2,6	4.5 pints	5.5 pints
Transfer gearbox oil	3,1	5.5 pints	6.5 pints
Rear differential oil	1,7	3 pints	3.5 pints
Front differential oil	1,7	3 pints	3.5 pints
Swivel housing oil (each)	0,26	0.5 pints	0.5 pints
Steering box oil	0,40	0.75 pints	0.75 pints
Cooling system	11,0	20 pints	24 pints
Fuel tank	81,5	18 gallons	21.5 gallons

Anti-freeze solutions. See next page for anti-freeze recommendations

Cooling system capacity		Anti-freeze required for 33⅓% solution		Anti-freeze required for 50% solution	
Litres	Pints	Litres	Pints	Litres	Pints
11,3	20	3,7	6.5	5,7	10

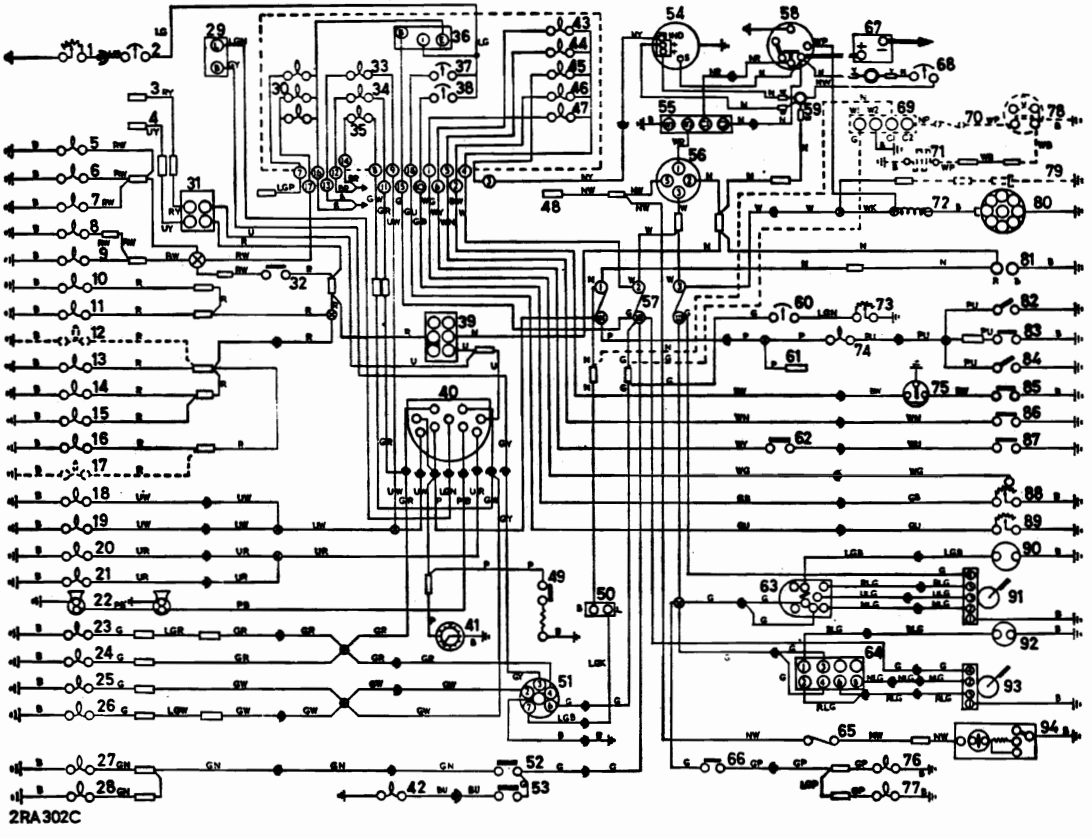
Recommended lubricants and fluids

These recommendations apply to temperate climates where operational temperatures may vary between —10°C (14°F) and 32°C (90°F).

Lubricants marked with an asterisk (*) are multigrade oils suitable for all temperature ranges.

COMPONENT	SAE	BP	CASTROL	DUCKHAMS	ESSO	MOBIL	TEXACO	SHELL
Engine Main gearbox Transfer gearbox	20W	*BP Super Visco-Static 20–50	*Castrol GTX	Duckhams Q20–50 Motor Oil	Uniflo or Esso Motor Oil 20W	Mobiloil Super or Mobiloil Special 20W/50	Havoline Motor Oil 20W–50	*Shell Super Oil
Differentials Swivel pin housings Steering box	90EP	BP Gear Oil SAE 90 EP	Castrol Hypoy	Duckhams Hypoid 90	Esso Gear Oil GX 90	Mobilube GX 90	Multigear Lubricant EP 90	Spirax 90 EP
All ball joints Front and rear hubs Propeller shafts	—	BP Energrease L2	Castrol LM Grease	Duckhams LB 70 Grease	Esso Multipurpose Grease H	Mobilgrease MP or Mobilgrease Super	Marfak Allpurpose	Retinax A or Darina AX
Power steering fluid reservoir, as applicable	—	BP Autran B	Castrol TQF	Duckhams Q-Matic	Essoglide	Mobil ATF 210	Texamatic Type F	Shell Donax T7
FUEL AND FLUIDS Fuel	91 to 93 Research Octane Fuel, 2-star grade in the United Kingdom with standard ignition timing (5° ATDC dynamic at 600 revs/min) 85-91 Research Octane Fuel, with reset ignition timing (8° ATDC dynamic at 600 revs/min)							
Brakes and Clutch	Lockheed Brake and Clutch Fluid Specification current 329S and US Federal Standard 116							
Anti-freeze solution for cooling system	Bluecol AA coloured green for winter and summer use, or anti-freeze conforming to British Standard No. 3150 or Prestone or anti-freeze to MIL-E-5559 formulation.							
Inhibitor solution for cooling system	Marston Lubricants SQ36—Coolant inhibitor concentrate. For summer use only when frost precautions are not necessary							

CIRCUIT DIAGRAM

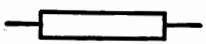


Circuit diagram, Range Rover

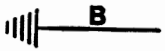
Key to circuit diagram, Range Rover

1 Oil temperature transmitter
2 Oil temperature gauge
3 Pick-up point for auxiliary driving lamps
4 Pick-up point for auxiliary driving lamps
5 Ammeter illumination
6 Oil temperature gauge illumination
7 Cigar lighter illumination
8 Oil pressure gauge illumination
9 Clock illumination
10 Side lamp, LH
11 Side lamp, RH
12 Side marker lamp, tail, LH, as applicable
13 Tail lamp, LH
14 Number plate illumination
15 Number plate illumination
16 Tail lamp, RH
17 Side marker lamp, tail, RH, as applicable
18 Headlamp main beam, RH
19 Headlamp main beam, LH
20 Headlamp dip, RH
21 Headlamp dip, LH
22 Horns
23 Indicator lamp, rear LH
24 Indicator lamp, front LH
25 Indicator lamp, front RH
26 Indicator lamp, rear RH
27 Reverse lamp
28 Reverse lamp
29 Indicator unit, 8 FL
30 Trailer illumination
31 Switch auxiliary driving lamps
32 Switch, panel lights
33 Warning light, headlamp main beam
34 Warning light, indicator, LH
35 Warning light indicator, RH
36 Voltage stabiliser
37 Water temperature gauge
38 Fuel gauge
39 Switch, main light
40 Switch, headlamps, direction indicators and horn
41 Clock
42 Warning light, differential lock switch
43 Warning light, cold start control
44 Warning light, oil pressure
45 Warning light, ignition
46 Warning light, brake
47 Warning light, fuel level
48 Pick-up point for radio
49 Cigar lighter
50 Hazard warning unit
51 Switch, hazard warning
52 Switch, reverse lights
53 Switch, differential lock
54 Alternator
55 Relay for starter motor
56 Switch, ignition
57 Fuses
58 Starter motor
59 Terminal post
60 Oil pressure gauge
61 Pick-up point for seven pin trailer socket
62 Switch, cold start
63 Switch, front wiper and washer
64 Switch, rear wiper and washer
65 In-line fuse for heater
66 Switch, stop lamps
67 Battery
68 Ammeter
69 Relay for heated rear screen
70 In-line fuse for heated rear screen
71 Heated rear screen
72 Ignition coil
73 Oil pressure transmitter
74 Interior light
75 Shuttle valve for brake switch
76 Stop lamp, LH
77 Stop lamp, RH
78 Switch, heated rear screen
79 Electric fuel pump
80 Distributor
81 Inspection light sockets
82 Switch, courtesy light
83 Switch, interior light
84 Switch, courtesy light
85 Switch, handbrake
86 Switch, oil pressure
87 Switch, cold start control pick-up point
88 Fuel gauge, tank unit
89 Water temperature transmitter
90 Windscreen washer motor
91 Windscreen wiper motor, two-speed
92 Rear screen washer motor
93 Rear screen wiper motor, single-speed
94 Heater motor, two-speed

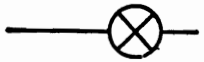
Key to circuit symbols


Snap connectors


Earth connections via fixing bolts



Earth connections via cables


Permanent in-line connections


Connections via plug and socket

Key to cable colours

B—Black G—Green K—Pink L—Light N—Brown O—Orange P—Purple R—Red S—Slate U—Blue W—White Y—Yellow

The last letter of a colour code denotes the tracer colour.

Passenger compartment	Every 5,000 km (3,000 miles) or 3 months	Every 10,000 km (6,000 miles) or 6 months	Every 20,000 km (12,000 miles) or 12 months
Check/adjust steering backlash	★	★	★
Check footbrake operation; adjust to manufacturers instructions	★	★	★
Check handbrake operation; adjust to manufacturers instructions	★	★	★
Check function of original equipment i.e. interior and exterior lamps, horns, wipers and warning indicators	★	★	★
Check condition and security of seats and seat belts	★	★	★
Check rear view mirror for cracks and crazing	★	★	★
Check/top up main gearbox oil		★	★
Check operation of doors and bonnet locks		★	★
Check operation of window controls		★	★
Exterior			
Check/adjust headlamp alignment	★	★	★
Check, if necessary renew wiper blades	★	★	★
Inspect brake pads for wear and discs for condition	★	★	★
Check/adjust tyre pressures including spare	★	★	★
Check tyres for tread depth, cuts in tyre fabric, exposure of ply and cord structure, lumps or bulges	★	★	★
Check tightness of road wheel fastenings	★	★	★
Check/adjust front wheel alignment		★	★

Underbody	Every 5.000 km (3,000 miles) or 3 months	Every 10.000 km (6,000 miles) or 6 months	Every 20.000 km (12,000 miles) or 12 months
Check for oil leaks	★	★	★
Renew engine oil		★	★
Check exhaust system for leaks and security	★	★	★
Check visually fuel pipes and unions for chafing, leaks and corrosion	★	★	★
Check visually brake/clutch hydraulic pipes and unions for chafing, leaks and corrosion	★	★	★
Check condition and security of steering unit, joints and gaiters	★	★	★
Check/top up front axle oil		★	★
Renew front axle oil			Every 40.000 km (24,000 miles) or 24 months
Check/top up swivel pin housings oil		★	★
Renew swivel pin housings oil			Every 40.000 km (24,000 miles) or 24 months
Drain flywheel housing if drain plug is fitted for wading	★	★	★
Renew main gearbox oil			Every 40.000 km (24,000 miles) or 24 months
Check/top up transfer box oil		★	★

MAINTENANCE SCHEDULE

Underbody (*continued*)	Every 5.000 km (3,000 miles) or 3 months	Every 10.000 km (6,000 miles) or 6 months	Every 20.000 km (12,000 miles) or 12 months
Renew transfer box oil			Every 40.000 km (24,000 miles) or 24 months
Lubricate handbrake mechanical linkage		★	★
Clean fuel pump filter			Every 80.000 km (48,000 miles) or 48 months
Lubricate propellor shaft		★	★
Lubricate propellor shaft sealed sliding joint			Every 40.000 km (24,000 miles) or 24 months
Check/top up rear axle oil		★	★
Renew rear axle oil			Every 40.000 km (24,000 miles) or 24 months
Renew engine oil filter		★	★
Engine compartment			
Check/top up cooling system	★	★	★
Check all cooling/heater hoses for security and condition		★	★

Engine compartment (*continued*)	Every 5.000 km (3,000 miles) or 3 months	Every 10.000 km (6,000 miles) or 6 months	Every 20.000 km (12,000 miles) or 12 months
Renew all cooling/heater hoses			Every 80.000 km (48,000 miles) or 48 months
Check for oil leaks	★	★	★
Check/top up clutch fluid reservoir	★	★	★
Check/top up brake fluid reservoir	★	★	★
Check/top up steering box (manual type)			★
Check condition and security of steering unit	★	★	★
Check/top up battery electrolyte	★	★	★
Clean and grease battery connections		★	★
Clean alternator slip ring end bracket and moulded cover			★
Clean/adjust spark plugs		★	
Renew spark plugs			★
Check/adjust distributor points		★	
Renew distributor points			★
Lubricate distributor		★	★
Check high tension leads			★
Check/adjust ignition timing and distributor characteristics using electronic equipment		★	★

Engine compartment (*continued*)	Every 5.000 km (3,000 miles) or 3 months	Every 10.000 km (6,000 miles) or 6 months	Every 20.000 km (12,000 miles) or 12 months
Check driving belts, adjust or renew	★	★	★
Check/top up screen washer reservoir	★	★	★
Renew fuel filter element			★
Renew engine flame traps			★
Check/top up engine oil	★		
Check/top up fluid in power steering reservoir	★	★	★
Check for fluid leaks from power steering	★	★	★
Check operation of air cleaner intake mixing flap valve			★
Renew carburetter/air intake cleaner elements			★
Renew engine breather filter			Every 40.000 km (24,000 miles) or 24 months
Lubricate accelerator linkage, check operation		★	★
Top up carburetter piston dampers		★	★
Check/adjust carburetter idle settings		★	★
Check/adjust throttle control vacuum switch		★	★
Renew charcoal container			Every 80.000 km (48,000 miles) or 48 months

Road test	Every 5.000 km (3,000 miles) or 3 months	Every 10.000 km (6,000 miles) or 6 months	Every 20.000 km (12,000 miles) or 12 months
Road test and check function of all instrumentation		★	★

Preventive maintenance

Renew hydraulic brake fluid			Every 30.000 km (18,000 miles) or 18 months
Renew rubber seals in brake system			Every 60.000 km (36,000 miles) or 36 months

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Range Rover Supplement 1
6 x 4 Crash Rescue Unit

Part No. RTC 9108

This supplement gives information and where necessary maintenance details on additional items fitted to the 6 x 4 Crash Rescue Unit, Range Rover and should be used in conjunction with the Range Rover Owner's Manual, Part No. 606917.

The vehicle incorporates a load carrying axle which is positioned behind the driven axle. It is a standard axle casing with the differential and drive shafts removed. Blanking plates are fitted over the differential and drive shaft apertures to prevent the ingress of mud and water etc. Lubrication is confined to the wheel hubs which are assembled in the normal way.

The load carrying axle is fitted with springs and a self levelling device: however to cope with the additional weight when the vehicle is fully laden the springs on both rear axles contain 'helper' springs located inside the main coil spring. Heavy duty springs are fitted to the front suspension.

April 1974

Bleeding the brake system. Figs. 1 and 2.

If the brakes feel spongy, this may be caused by air in the hydraulic system. This air must be removed by bleeding the hydraulic system at the disc cylinders; one bleed point at each side on the rear, and three at each side on the front.

The following additional points should be noted when bleeding the dual system. Varying brake pedal travel will be experienced depending upon the degree of bleeding required. Bleeding the primary system, that is, both rear brakes and half the front brakes with the secondary system fully operational, almost full brake pedal travel can be used. When bleeding the secondary system, that is, half the front brakes only, with the primary system fully operational, approximately half the total brake pedal travel can be used.

Important: If bleeding the secondary system only, commence with the front caliper **furthest** from the master cylinder, and bleed from the screw on the same side as the fluid inlet pipes, then close the screw, and bleed from the screw on the opposite side on the same caliper. Repeat for the other front caliper.

An advantage with the dual system is the ability to change brake components without having to bleed both systems. The only requirement to bleed the complete system is following the removal and refitting of the servo unit, the pressure failure switch, or complete disconnection and reconnection of the pipes.

To bleed the complete system, proceed as follows:

1. Attach a length of rubber tubing to the bleed screw on the rear left-hand caliper on the load carrying axle and place the lower end of the tube in a glass jar containing brake fluid.
2. Slacken the bleed screw.

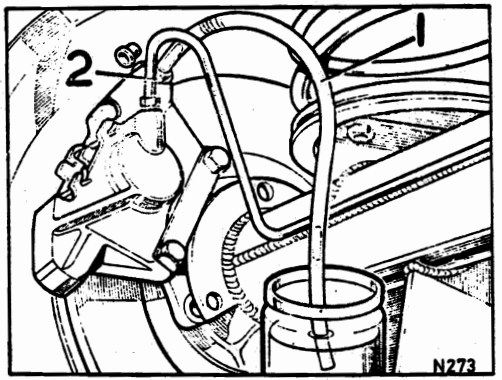

Fig. 1. Rear brake bleed screw

3. When the fluid appears in the jar, commence pumping the brake pedal slowly; pause at least five seconds at each end of the return stroke to allow the master cylinder piston to recuperate. Continue pumping until the fluid issuing from the tube shows no signs of air bubbles when the tube is held below the surface of the fluid in the jar.

4. Hold the tube under the fluid surface, and with the foot brake fully depressed, tighten the bleed screw and replace the dust cap.

5. Repeat for the rear right-hand caliper, on the load carrying axle.

6. Repeat the above procedures for the driven rear axle commencing at the caliper furthest from the master cylinder.

7. Attach a bleed tube to the primary bleed screw on the front caliper **furthest away** from the master cylinder.

8. Attach a second bleed tube to the secondary bleed screw on the same side of the caliper as the primary bleed screw, using two separate bleed jars.

9. Slacken both bleed screws.

10. When the fluid appears in the bleed jars, commence pumping the brake pedal slowly, pausing at each end of the return stroke, to allow the piston to recuperate, until fluid being expelled is free of air in both jars.

11. Hold the tubes under the fluid surface and with the brake pedal fully depressed, tighten both bleed screws and replace both dust caps.

12. Attach a bleed tube to the remaining secondary bleed screw on the same caliper.

13. Slacken the bleed screw.

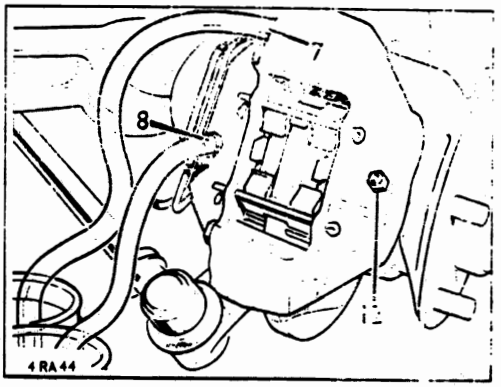

Fig. 2. Front brake bleed screws

14. When the fluid appears in the jar commence pumping the brake pedal slowly, pausing at each end of the return stroke, to allow the piston to recuperate, until all air is expelled. Hold the tube under the fluid surface and with the brake pedal fully depressed, tighten the bleed screw and replace dust cap.

15. Repeat this procedure for the front caliper **nearest** to the master cylinder.

16. The fluid in the reservoir should be replenished throughout the operation to prevent another air lock being formed, using only new fluid. Lockheed Brake and Clutch Fluid Specification, current 329S and US Federal Standard 116 from sealed tins.

17. It will be obvious that the above operation requires two people.

Split charge system, when fitted

This circuit provides an additional source of electrical supply and allows separate charging and discharging of additional batteries that may be carried for auxiliary equipment without affecting the charge state of the main battery.

The kit has a terminal box pick-up facility and is used in conjunction with a 20 ACR alternator.

A diode unit which enables two batteries to be charged independently without electrical feed-back is fitted to the right-hand front wing valance.

An ammeter mounted on the dash panel indicates the auxiliary charge reading.

Terminal box pick up assembly

+ and — terminals 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 (60 amps). When charging more than one 12 volt battery, interconnections between batteries must be made in parallel.

Tyre pressures

All conditions:	Front	2,1 Kg/cm² (30 lb/sq in.)
	Rear	2,8 Kg/cm² (40 lb/sq in.)

Gross vehicle weight (fully laden)

Front axle	1082 Kg (2,380 lb)
Rear axle (driven)	1505 Kg (3,320 lb)
Rear axle (load)	1505 Kg (3,320 lb)
Total weight	4100 Kg (9,020 lb)