



Owner's

Maintenance

Manual

Part No. 4852

LAND-ROVER

Owner's Maintenance Manual

Incorporating Free Service and Maintenance Schedules

COVERING SERIES IIA BONNETED CONTROL

SERIES IIB FORWARD CONTROL

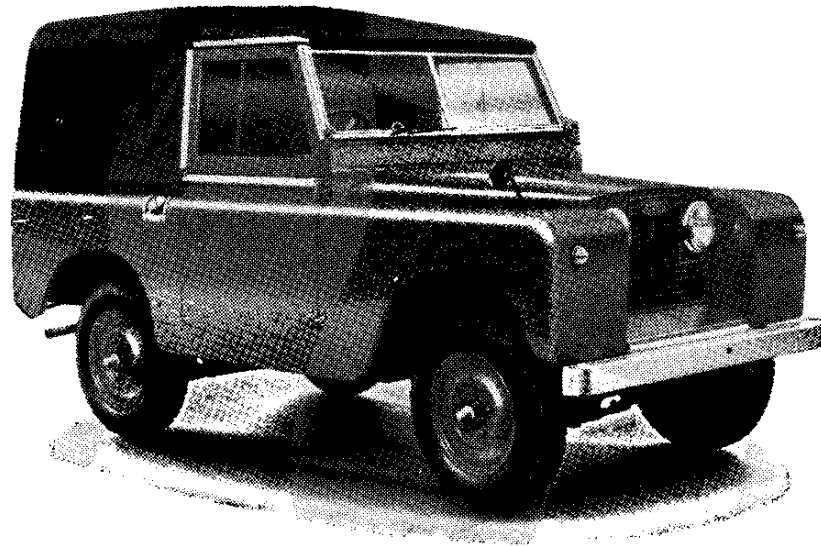
PETROL AND DIESEL MODELS

NEGATIVE EARTH ELECTRICAL SYSTEM

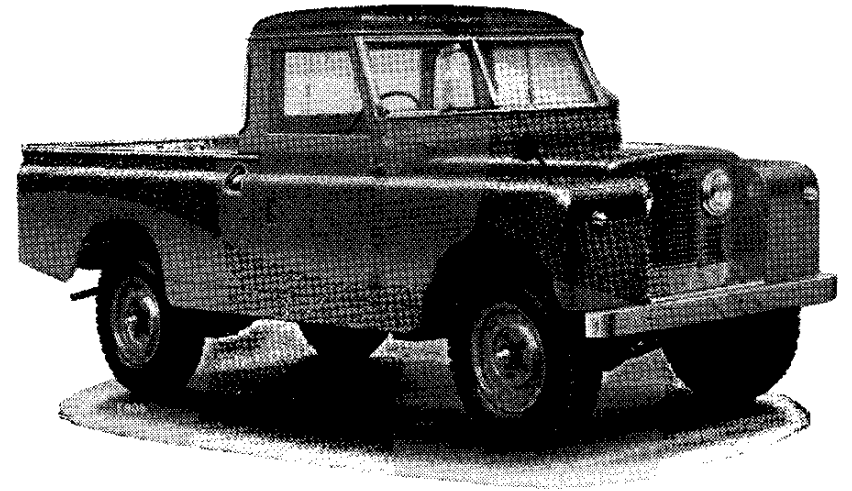
**THE ROVER CO. LTD
SOLIHULL
WARWICKSHIRE
ENGLAND**

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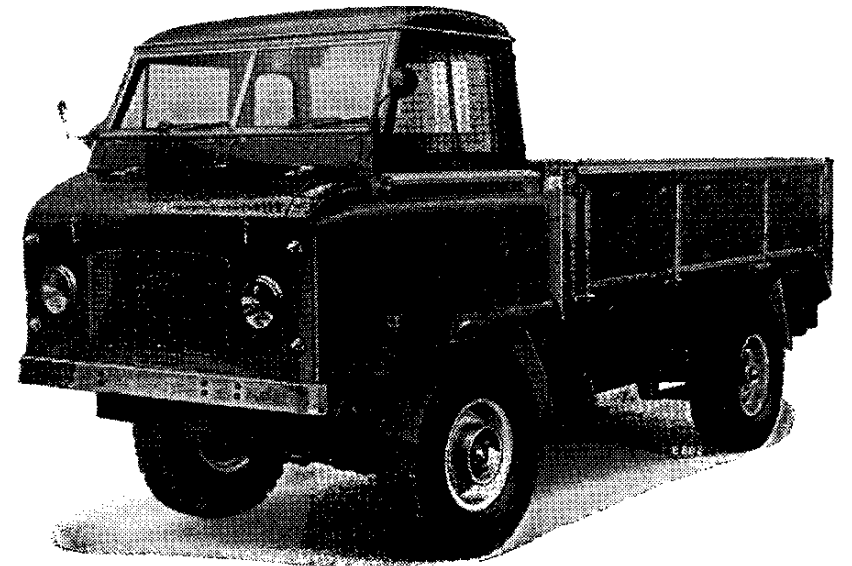
Series IIA 88 'Regular', bonneted control



Series IIA 109 'Long', bonneted control



Series IIA 109 Station Wagon, bonneted control



Series IIB 110 Forward Control

LAND-ROVER MODELS

Introduction

This book has been prepared to provide supplementary information to that contained in the Owner's Instruction book. Its intention is to give clear and simple information necessary for the efficient care and maintenance of the vehicle.

It covers both the Petrol and Diesel models. The paragraphs in this book are therefore applicable to both models, unless otherwise stated in the sub-heading.

This book is divided into four sections:

- Part 1. Routine maintenance and adjustments.
- Part 2. Electrical equipment, optional equipment, fault finding, etc.
- Part 3. General data and index to Parts 1 and 2.
- Part 4. Free Service and Maintenance Schedules.

The new vehicle pre-delivery check will have been carried out by the Distributor or Dealer responsible for the sale of the vehicle, leaving a stub in the book to certify that the work has been done.

The routine maintenance of this vehicle has been kept down to a minimum and can, if desired, be carried out by operators without special tools. Any work beyond that detailed in this book should be entrusted to Rover Distributors or Dealers who are equipped and prepared also to carry out the routine maintenance.

It should be noted that the sequence of normal maintenance repeats itself every 24,000 miles (36,000 km).

The Rover Company is always prepared to give advice on maintenance or other matters to individual owners, but any correspondence with the Company *must bear the chassis number* which will be found on a plate affixed to the dash panel in front of the gear levers.

PART ONE

ROUTINE MAINTENANCE AND ADJUSTMENTS

Notes on general maintenance

Lubrication and maintenance are necessary to keep any vehicle in good mechanical condition. All the items which require regular maintenance as detailed in the Maintenance Section are shown in Part One of this book in terms of mileage which would apply in a temperate climate under clean working conditions. 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 judgment of the operator or to advice from a Rover Distributor or Dealer, but the recommendations will serve as a firm basis for maintenance work.

If the vehicle is used almost exclusively in low transfer ratio or for stationary work, mileage is of no use whatever in deciding maintenance intervals; lubrication attention must then be based on operation hours.

Of particular importance in this connection are the undermentioned 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 4,000 miles (6,000 km) or every four months, whichever comes first.
3. Every month check tyre pressures and inspect tyre treads.

4. Every month check brake fluid level and battery acid level.
5. 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 a Rover Distributor or Dealer.

Engine. Under severe conditions of mud or dust, the first and subsequent oil changes must be more frequent, even to the extent of a daily change. Under deep wading conditions through water carrying mud and grit, a daily oil change is essential.

Air cleaner. When the vehicle is used for dusty road or field work, attention must be more frequent and may involve a daily oil change; under extremely bad conditions, cleaning twice daily may be called for.

Gearbox, transfer box, differentials and swivel pin housings. It is essential to change oil much more frequently than indicated if the vehicle is operated under bad conditions, especially if deep wading is carried out.

Propeller shafts. Under tropical or severe conditions, particularly where sand is encountered, the sliding joints must be lubricated very frequently to prevent ingress of abrasive material.

This also applies to the fan driving shaft fitted on Forward Control models.

Fuel system, Diesel models. Absolute cleanliness is essential when dealing with the fuel system. The filters must receive regular attention to ensure efficient running and to prevent damage to the distributor pump and injectors. The quantity of fuel and general operating conditions will determine to a large extent how often the filters need attention.

Lubricants. The recommended lubricants have been found suitable for the Land-Rover and should be used whenever possible in the grades specified. When ordering oil, the correct grade, as well as the make, should be clearly stated.

The Rover Company attaches very great importance to the nature of the lubricants used in its products and therefore gives specific recommendations as detailed on the next page.

Should any of the recommended lubricants not be available in certain overseas territories, the Rover Distributor or Dealer for that territory will obtain specific guidance from The Rover Company, or owners may communicate with the Company where they so wish.

Multigrade oils, produced by the makers of the lubricants listed overleaf, are also approved for the range of SAE grades that they cover.

Rover parts

It is important that operators should recognise the necessity of using only genuine Rover Parts or Rover Approved Parts when repair or maintenance work is being carried out on the Land-Rover.

Rover parts are produced to the same high standard as those parts built into the vehicle in its original production and it is in your best interest that you should insist that only genuine Rover Parts or Rover Approved Parts are fitted to your Land-Rover.

Recommended lubricants and fluids

These recommendations apply to temperate climates where operational temperatures may vary between approximately 10°F (-12°C) and 90°F (32°C).

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

Information on oil recommendations for use under extreme winter or tropical conditions can be obtained from your local Rover Distributor or Dealer or The Rover Co. Ltd., Technical Service Department.

COMPONENTS	SAE	BP	CASTROL	DUCKHAM'S	ESSO	MOBIL	REGENT TEXACO- CALTEX	SHELL
Petrol models Engine, air cleaner and governor	20W	*BP Super Visco-static 10W-40	*Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Arctic	Havoline 20/20W	*Shell Super Oil
Diesel models Engine and air cleaner	20W	BP Energol Diesel D20W	Castrol CRI20	NOL Diesel Engine Oil 20	Essofleet HD20	Mobiloil Arctic	RPM Delo Special 20	Rotella 20/20W
Gearbox and transfer box *Differentials and swivel pin housings Steering box Steering relay unit Rear power take-off, pulley unit and capstan winch hydraulic winch gearbox	90EP	BP Energol SAE 90EP	Castrol Hypoy	Duckham's Hypoid 90	Esso Gear Oil GP 90/140	Mobilube GX 90	Multigear Lubricant 90	Spirax 90 EP
Hydraulic winch supply tank	—	*BP Super Visco-static 10W-40	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energrease L 2	Castrol LM	Duckham's LB10 Grease	Esso Multi- purpose Grease H	Mobilgrease MP or Mobil Special grease	Marfak Multi- purpose 2	Retinax A
Brake and clutch fluid	Castrol Girling 'Crimson' Brake and Clutch Fluid. Specification SAE 70 R3							
Anti-freeze solution	Any anti-freeze solution conforming to British Standard No. BS 3152							

*Rear differential, limited-slip type: Castrol 90EP-LS, Fina Pontonic Plus, Shell Limited-Slip Differential Oil S6721A or Mobilube 46—available in the UK market.
Pure Oil TSS90, Texaco 3450 or Mobil 46—available in the North America Dollar area.

Routine maintenance

On the following pages, in the same general order as listed in the Maintenance Section of this book, will be found full instructions on how to carry out the maintenance and adjustments required on the Land-Rover models.

Absolute cleanliness is essential when carrying out the maintenance work that follows.

The maintenance periods are given in miles and kilometres only. When using the vehicle for stationary work or under arduous conditions, refer to the chart in the maintenance section of this book for equivalent periods based on fuel consumption or hours' running time.

Full details of the maintenance required on the Land-Rover are available in chart form on application to: The Rover Company Limited, Technical Service Department, Solihull, Warwickshire, England.

Engine oil level—Daily or weekly, depending on operating conditions. All models

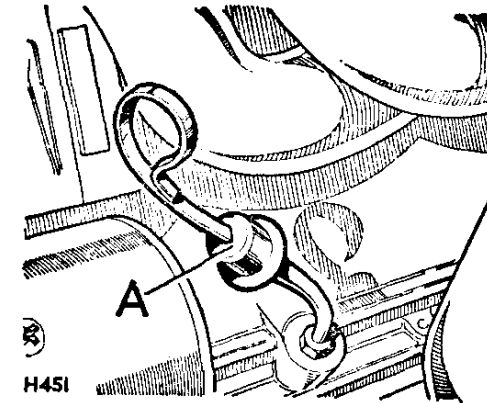
Proceed as follows:

Stand the vehicle on level ground and allow the oil to drain back into the sump. Withdraw the dipstick, wipe it clean, re-insert to its full depth and remove a second time to take the reading. Add oil as necessary; never fill above the 'III' mark.

The oil level dipstick on 4-cylinder models carries three marks: III, II and I MIN. Under normal circumstances the oil level should not be allowed to fall below the minimum level mark 'I MIN', that is the lower line on the dipstick.

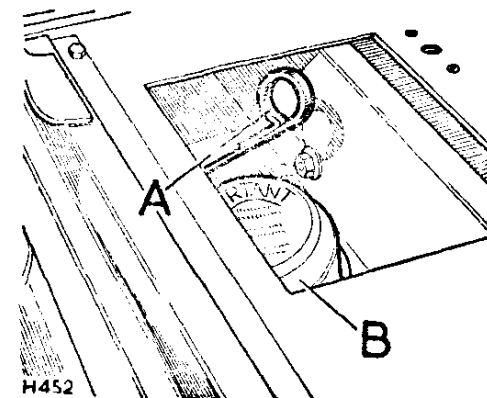
However, when the Land-Rover is being used at steep angles, the oil should not be allowed to fall below the intermediate mark 'II', that is, the low level. This will obviate any danger of oil pump starvation when the vehicle is facing downhill at a steep angle.

Forward Control models. Both dipstick and oil filler are accessible after removing the left-hand seat cushion and cover panels.



Engine oil level dipstick, 4-cylinder models

A—Dipstick at left-hand side of engine



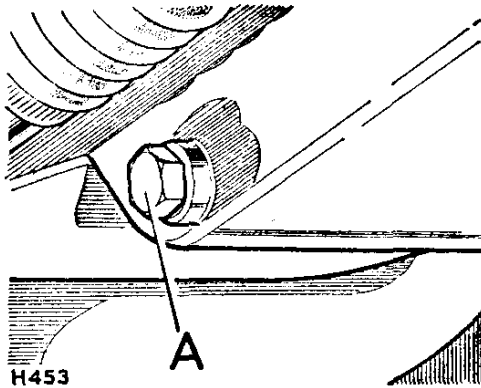
Engine oil level dipstick and oil filler, 6-cylinder models Forward Control illustrated

A—Dipstick at left-hand side of engine

B—Oil filler cap

Engine sump drain plug

A—Drain plug at right-hand side of engine



Engine oil changes and filter replacement. Oil changes—every 4,000 miles (6,000 km) or every four months, whichever comes first; filter replacement—every 8,000 miles (12,000 km). All models

To change the engine oil:

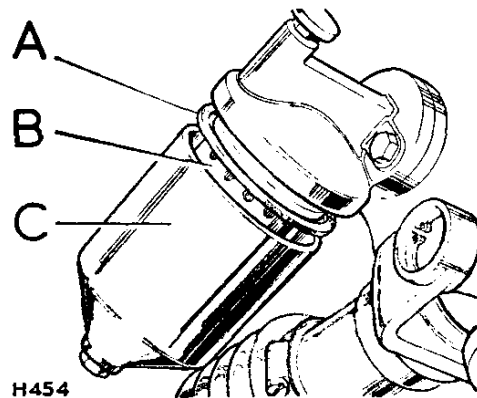
Run the engine to warm up the oil, then stop. Remove the drain plug in the right-hand side of the sump. Allow oil to drain away completely and replace the plug.

To change filter, located at right-hand side of engine:

1. Place oil tray under engine.
2. Unscrew the bolt from the filter adaptor and remove the container and element.
3. Discard the used filter element and large rubber washer.
4. Wash the container in petrol.
5. Place the new filter element in the container and reassemble the unit, using the new large rubber washer supplied with the element.
6. Ensure that all the sealing washers are in position and intact, and that the container is correctly located in the adaptor.

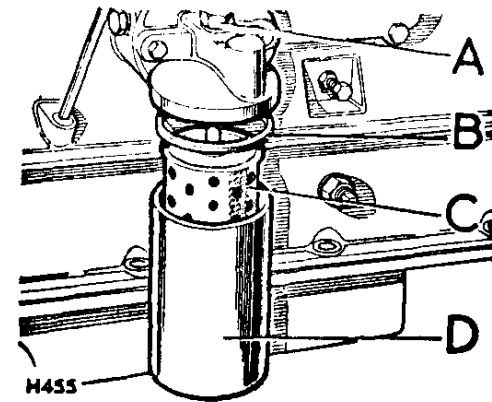
Engine oil filter, 4-cylinder models

A—Rubber washer, large
B—Oil filter element
C—Container for oil filter



Refill with oil of the correct grade through the filler at the front of the engine; the total capacity including filter is: 4-cylinder models: 11 Imperial pints, 12 US pints (6,0 litres); 6-cylinder models: 10 Imperial pints, 11½ US pints (5,5 litres).

Run engine and check for oil leaks at filter and drain plug.



Engine oil filter, 6-cylinder models

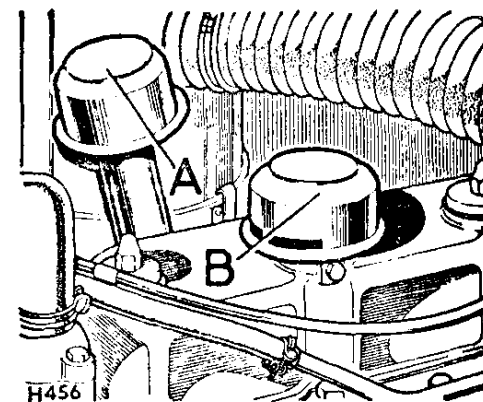
- A—Bolt fixing filter container
- B—Rubber washer, large
- C—Element for filter
- D—Container for filter

Engine breather filters—Every 8,000 miles (12,000 km). All models

Clean as follows:

Remove the filters and wash the gauze thoroughly by swilling the units in petrol. Re-wet the gauzes by dipping in clean engine oil and shake off the surplus; replace the engine breather filter with the slot facing forward and the oil filler filter with the slot facing the rear of the vehicle. On Forward Control 6-cylinder models the rocker cover filter is at the rear of the engine.

6-cylinder 'Long' models are fitted only with the oil filler filter and crankcase breather filter.

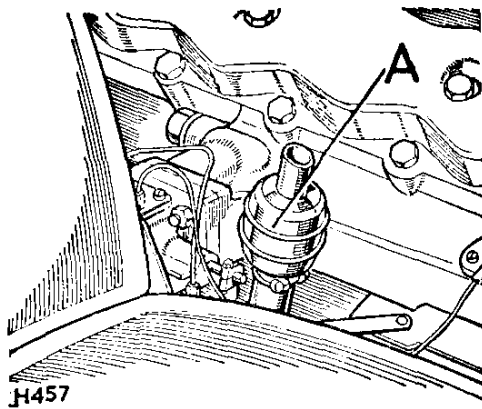


Engine breather filters

- A—Oil filler filter
- B—Engine breather filter

Crankcase breather filter, 6-cylinder models

A—Breather filter



Crankcase breather filter, 6-cylinder models—Every 8,000 miles (12,000 km).

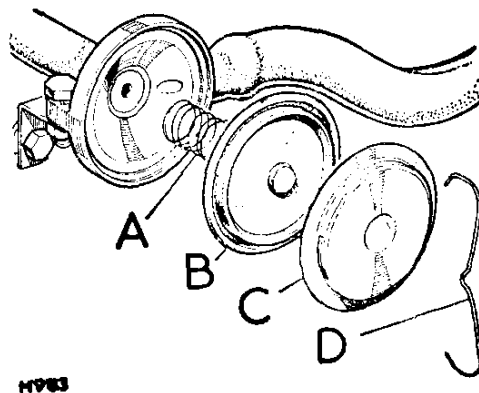
Clean as follows:

1. Forward Control models, remove the engine cover panel.
2. Slacken the hose clip and withdraw the filter.
3. Wash the gauze thoroughly by swilling the unit in petrol and re-wet the gauze by dipping in clean engine oil.
4. Shake off the surplus and refit to breather pipe.
5. Forward Control models, replace engine cover panel.

Under severe conditions of dust the filter must be cleaned more frequently.

Crankcase emission control, diaphragm type

- A—Spring for diaphragm
- B—Diaphragm unit
- C—Cover for control
- D—Spring clip retaining cover



Crankcase emission control, diaphragm type (as applicable)—Every 8,000 miles (12,000 km).

Clean as follows:

1. Remove the spring clip retaining the cover, which can now be removed together with the diaphragm unit and spring.
2. Clean orifices control body and cover in methylated spirits.
NOTE: The diaphragm must not be cleaned.
3. Check all components for damage.

To re-assemble:

1. Replace the spring, locating it in the body.
2. Locate the diaphragm in the body and on to the spring.
3. Replace the cover and refit the spring clip. Ensure diaphragm is seating properly and cover fits evenly to body.
4. Warm up engine and re-adjust carburetter if necessary.

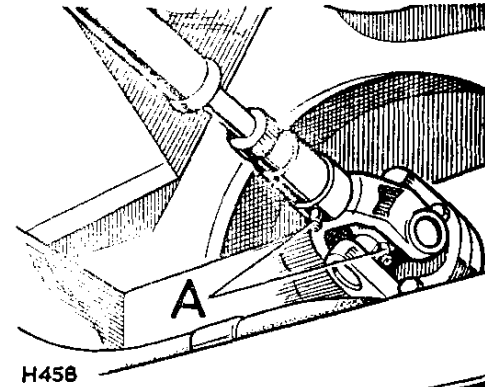
Crankcase emission control, flame-trap type (as applicable)—
Every 20,000 miles (30,000 km).

Clean as follows:

1. Detach the rubber hoses from each side of the flame trap.
2. Remove the nut retaining the flame trap bracket to the thermostat housing.
3. Withdraw flame trap; wash in clean petrol and allow to dry out completely.
4. Reverse removal procedure.
5. Warm up engine and re-adjust carburetter if necessary.

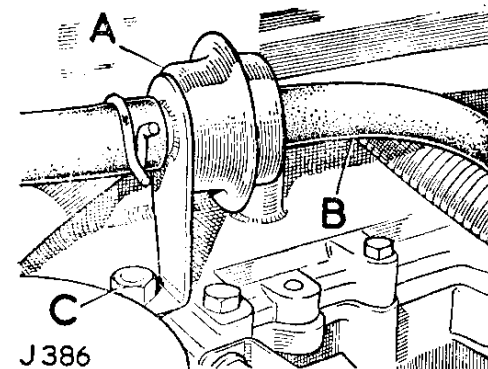
Fan drive shaft lubrication—Every 4,000 miles (6,000 km).
Forward Control models

Lubricate the sliding spline and universal joints on the fan drive shaft with one of the recommended greases.



Fan drive shaft,
Forward Control
models

A—Grease nipples



Crankcase
emission control,
flame-trap type

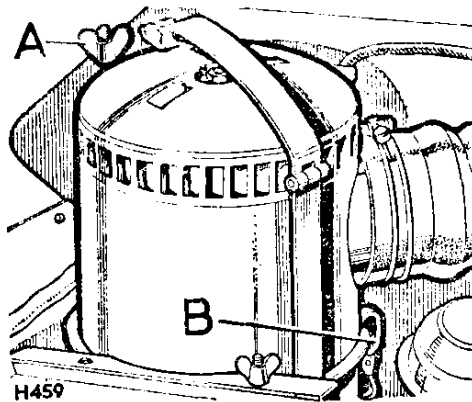
A—Flame trap

B—Hose

C—Nut, fixing
flame trap

**Air cleaner,
Regular models
illustrated**

- A—Wing nut for
clamping strap
B—Securing clip



Air cleaner All models—Every 4,000 miles (6,000 km).

Attention to the air cleaner is extremely important, especially under dusty conditions, as engine wear generally will be seriously affected if the vehicle is run with an excessive amount of sludge in the cleaner oil bath.

In cases where the vehicle is operated under dusty road or field conditions, attention must be more frequent, even to the extent of a daily oil change; under extremely bad conditions, cleaning twice daily may be called for.

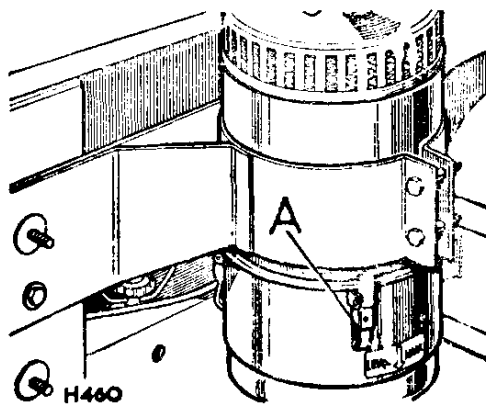
On Forward Control Petrol models remove the air cleaner cover panel, the oil bowl can then be detached with the air cleaner in position on the vehicle.

For all other models, proceed as follows:

1. Release the clamping strap securing the complete air cleaner. Disconnect the outlet elbow from the carburettor intake pipe and remove the cleaner from the vehicle.
2. Remove the oil bowl from the bottom of the cleaner by releasing the three securing clips.
3. Clean all dirty oil and sludge from the bowl and refill with fresh engine oil to the level indicated by a ring formed in the pressing; the capacity is approximately $1\frac{1}{2}$ Imperial pints (0,85 litre).
4. Clean the filter in the cleaner body by swilling the complete body in petrol or paraffin and shake off the surplus.
5. Replace the bowl and refit the complete unit in the vehicle.

**Air cleaner, Forward
Control 6-cylinder
models**

- A—Securing clip



Carburettor slow-running adjustment—Every 4,000 miles (6,000 km). 4-cylinder Petrol models

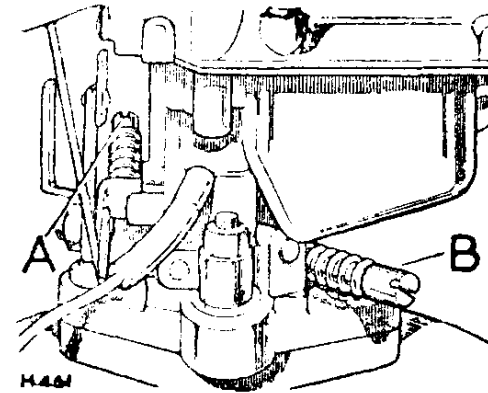
The only adjustments provided at the carburettor are a throttle stop screw and a volume control screw.

Should the carburettor require adjustment for any reason, proceed as follows:

1. Run the engine until normal operating temperature is obtained. If necessary adjust the throttle stop screw to give the correct idling speed.
2. Adjust the volume control screw so that the engine will idle evenly with no tendency to stall on snap closure of the throttle.
3. Check that, as the throttle is opened slowly, there is a clear positive acceleration of the engine speed.
4. Finally, it may be necessary to readjust the throttle stop screw to give a satisfactory idle speed.

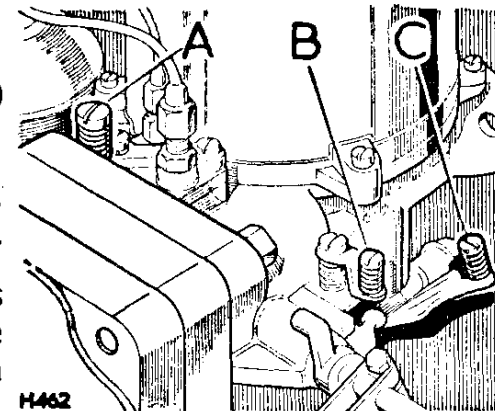
Carburettor slow-running adjustment—Every 4,000 miles (6,000 km). 6-cylinder Petrol models with SU carburettor

1. Run the engine until normal operating temperature is obtained. If necessary adjust slow-run valve to give the correct idling speed.
2. Lift the carburettor piston approximately $\frac{1}{32}$ in. (1 mm) by means of the lift pin situated on the right of the carburettor body. There is approximately $\frac{3}{16}$ in. (5 mm) free movement of the lift pin before it contacts the piston.



Carburettor slow-running adjustment
4-cylinder Petrol models

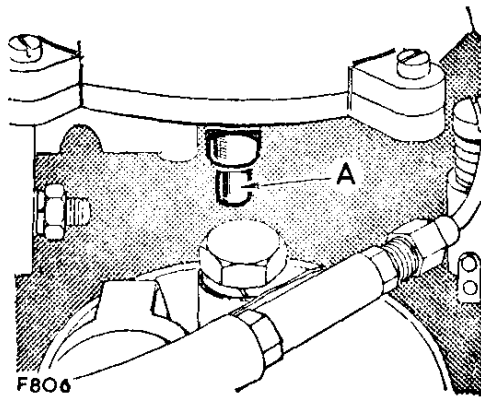
- A—Throttle stop screw
B—Volume control screw



Carburettor slow-running adjustment,
6-cylinder Petrol models with SU Carburettor

- A—Slow-run valve
B—Fast idle adjustment screw
C—Jet adjustment screw

**Carburettor lift-pin,
6-cylinder Petrol
models with SU
carburettor**
A—Lift-pin



If the engine speeds up immediately the mixture is too rich and the jet adjustment screw must be turned anti-clockwise, thus weakening the mixture; if the engine stops immediately, the mixture is too weak and the jet adjustment screw should be turned clockwise to enrich the mixture.

If the engine just falters and continues to run unevenly the adjustment is correct.

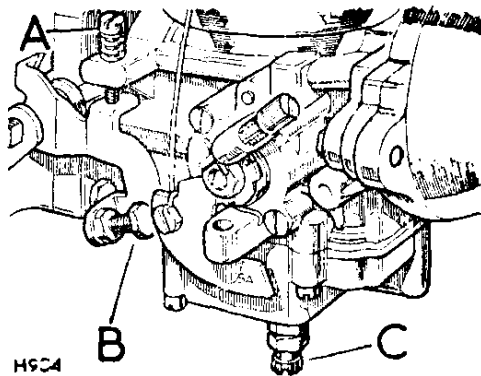
Finally adjust the slow-run valve to get a smooth idling speed.

The fast idle screw should not require adjustment.

Carburettor slow-running adjustment—Every 4,000 miles (6,000 km). 6-cylinder models with Zenith carburettor

**Carburettor slow-run-
ning adjustment.
6-cylinder petrol
models with Zenith
carburettor**

- A—Slow-run screw
- B—Fast idle screw
- C—Jet adjustment screw



1. Run the engine until normal operating temperature is obtained. If necessary adjust slow-run screw to give the correct idling speed.
2. Lift the carburettor piston approximately $\frac{1}{32}$ in. (1 mm) by means of the lift pin situated on the right of the carburettor body. There is approximately $\frac{3}{16}$ in. (5 mm) free movement of the lift pin before it contacts the piston.
3. If the engine speeds up immediately the mixture is too rich and the jet adjustment screw must be turned anti-clockwise, thus weakening the mixture; if the engine stops immediately, the mixture is too weak and the jet adjustment screw should be turned clockwise to enrich the mixture.

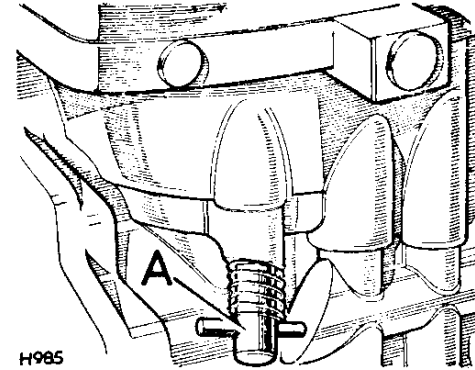
If the engine just falters and continues to run unevenly the adjustment is correct.

Finally adjust the slow-run screw to get a smooth idling speed.

The fast idle screw should not require adjustment.

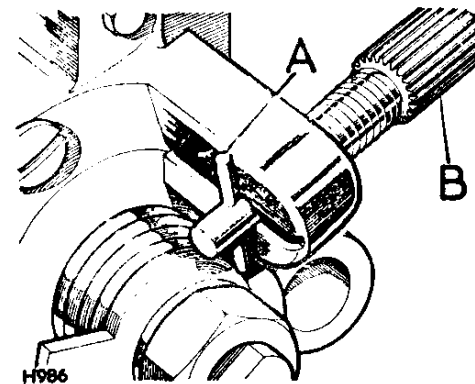
For starting at temperatures down to 0°F (−18°C) push and turn the spring-loaded choke adjustment screw so that the peg is at right angles to the slot. Leave in this position.

When starting at temperatures below 0°F (−18°C) turn the screw until peg is recessed in slot.



**Carburettor lift-pin,
6-cylinder petrol
models with Zenith
carburettor**

A—Lift-pin



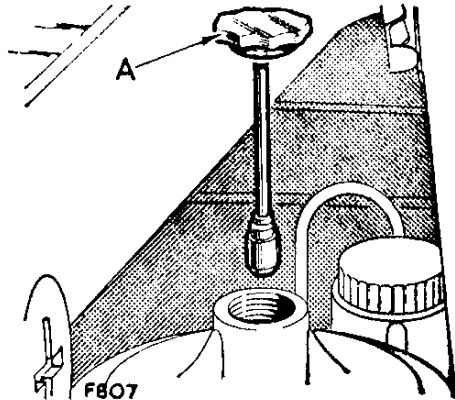
**Choke adjustment
screw, 6-cylinder
petrol models with
Zenith carburettor**

A—Peg for adjustment
screw

B—Spring-loaded
choke adjustment
screw

Carburettor hydraulic damper, 6-cylinder Petrol models

A—Cap and hydraulic damper

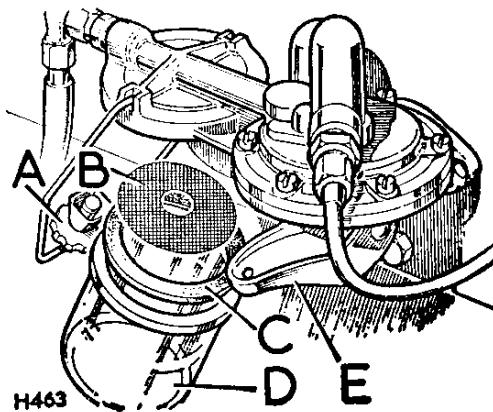


Carburettor hydraulic damper—Every 8,000 miles (12,000 km). 6-cylinder Petrol models

Unscrew the cap on top of the suction chamber, withdraw cap and hydraulic damper, replenish the damper reservoir as necessary with SAE 20 oil to within about $\frac{1}{2}$ in. (12 mm) from the top of the tube. Then replace cap and hydraulic damper.

Fuel pump and sediment bowl, 4-cylinder Petrol models

A—Retainer
B—Gauze
C—Sealing washer
D—Bowl
E—Hand priming lever



Fuel sediment bowl—Every 12,000 miles (18,000 km). Petrol models

The fuel sediment bowl provides an additional filter between pump and carburettor.

It is located:

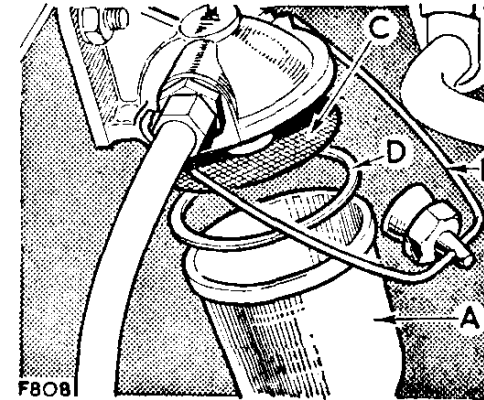
4-cylinder models, on the right-hand side of the engine.

6-cylinder 'Long' models, on the dash at the right-hand side of engine.

6-cylinder Forward Control models, below the right-hand side member attached to the air cleaner support bracket, accessible from underneath the vehicle.

Clean as follows:

1. Remove the bowl by slackening the thumb screw and swinging the retainer aside.
2. Remove and clean filter gauze in petrol.
3. Ensure that the sealing washer is in good condition.
4. Replace gauze and refit bowl.
5. 4-cylinder models, prime by operating hand lever.



**Fuel sediment bowl,
6-cylinder models**

A—Bowl
B—Retainer
C—Gauze
D—Sealing washer

Fuel pump, 6-cylinder Petrol models

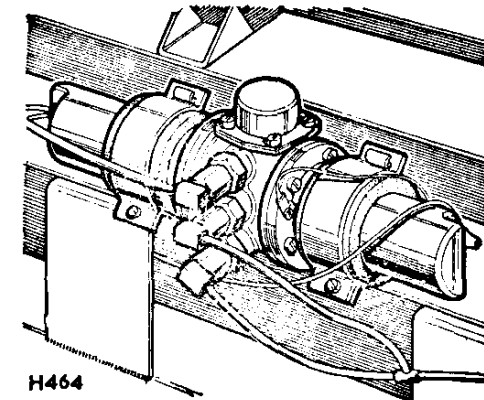
A dual fuel pump is fitted at the right-hand chassis side member.

On vehicles with one fuel tank both pumps will operate immediately the ignition is switched on, so filling the carburetter for easy starting.

With twin tank installations the pump connections are such that the primary and secondary pumps draw on the main and additional fuel tank respectively.

The secondary pump should be used once a week for a few miles' driving to ensure that it is kept in good condition.

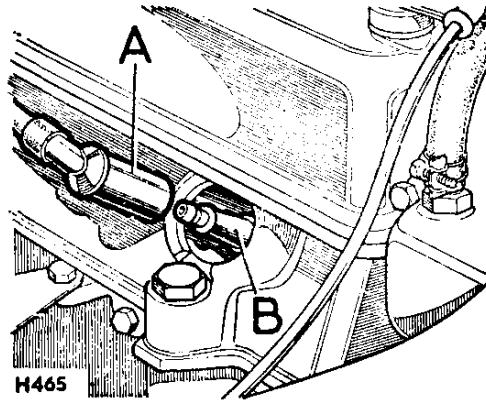
The change-over switch is situated behind the driver's seat.



**Dual fuel pump,
6-cylinder Petrol
models**

Sparking plug and cover

- A—Cover
- B—Sparking plug



Sparking plugs—Check every 4,000 miles (6,000 km); replace every 8,000 miles (12,000 km). Petrol models

The sparking plugs are fitted with plastic covers retained in the cylinder head by rubber rings. To gain access to the plugs for cleaning and gap-setting, pull up the plug covers without detaching them from the high tension leads.

Check or replace the sparking plugs as applicable; if the plugs are in good condition clean and re-set the electrode gaps to .029 to .032 in. (0,75 to 0,80 mm).

It is important that only the recommended sparking plugs are used for replacements:

4-cylinder models, use Champion N8.

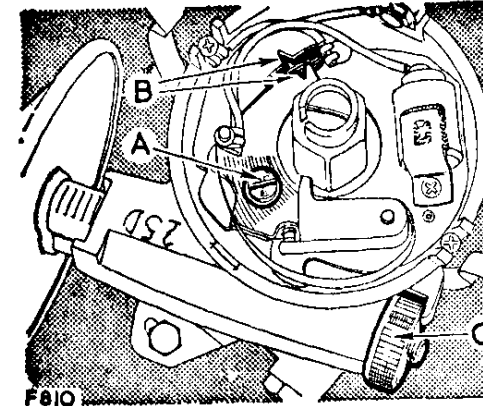
6-cylinder models, use Champion N5.

Before refitting sparking plugs, check and adjust the contact points, also check tappet adjustment when applicable.

Distributor contact points—Every 4,000 miles (6.000 km). Petrol models

Check and adjust the contact points clearance as follows. This is best done while the sparking plugs are removed, previous operation:

1. Remove the distributor cap and rotor arm; then turn the engine, using the starting handle, until the contacts are fully open.
2. The clearance should be .014 to .016 in. (0,35 to 0,40 mm) with the feeler gauge a sliding fit between the contacts.
3. If necessary, slacken the screw which secures the adjustable contact and adjust by the adjuster slot until the clearance is correct; re-tighten the retaining screw.
4. Replace the rotor arm and distributor cap.



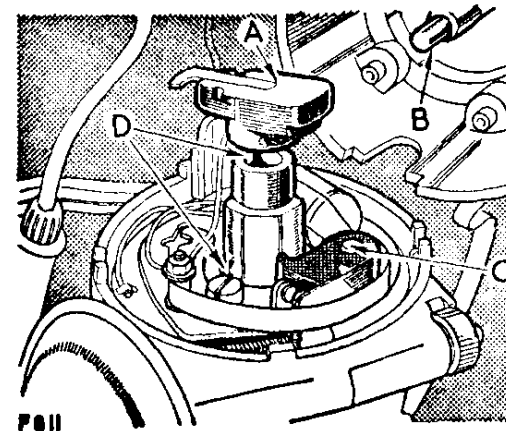
Distributor contact points

- A—Securing screw for adjustable contact
- B—Adjuster slot for contact points
- C—Adjuster screw, ignition timing

Distributor maintenance—Every 4,000 miles (6.000 km). Petrol models

Lubricate as follows:

1. Remove the distributor cap and rotor arm.
2. Lightly smear the cam with clean engine oil.
3. Add a few drops of thin machine oil to lubricate the cam bearing and distributor shaft. See illustration.
4. Add a few drops of thin machine oil through the hole in the contact breaker base plate, to lubricate the automatic timing control. See illustration.



Distributor

- A—Rotor arm
- B—Carbon brush
- C—Contact breaker lever pivot
- D—Lubricate at this point

5. Remove the nut on the terminal block and lift off the spring and moving contact, also remove adjustable contact secured with a screw. Ensure that the contacts are free from grease or oil; if they are burned or blackened, clean with a fine carborundum stone and wipe with a petrol-moistened cloth. Add a smear of grease to contact pivot before replacing the contacts. Then adjust as detailed in previous operation.
6. Wipe the inside and outside of the cap with a soft dry cloth; ensure that the small carbon brush works freely in its holder.
7. Replace rotor arm and distributor cap.

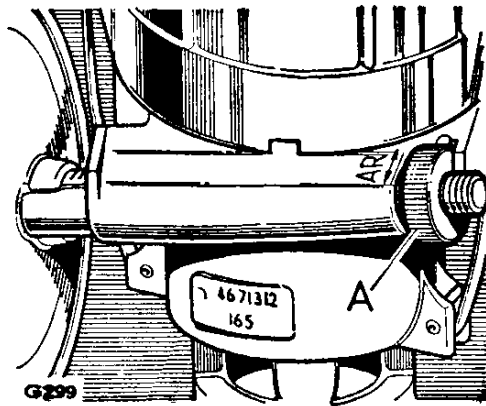
Ignition timing, Petrol models

In addition to automatic timing advance and retard mechanism, the distributor incorporates an adjuster screw, known as the octane selector. This is a vernier adjustment attached to the distributor, fitted with a sliding portion controlled by an adjusting screw. The body of the distributor is marked R (Retard) and A (Advance) to indicate direction of turn.

Should pinking develop as a result of the need for decarbonising, the control can be retarded a little by turning the screw in a clockwise direction. Do not forget to return it to the original position after decarbonising.

Ignition timing

A—Adjuster screw, ignition timing



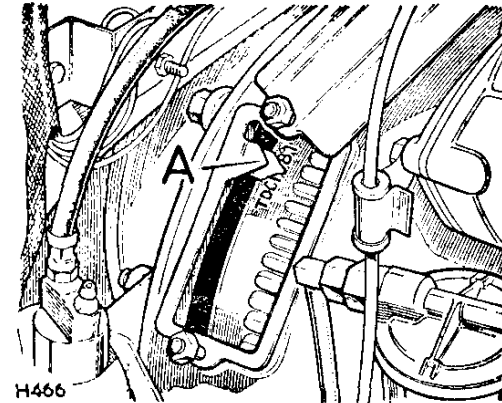
In certain countries very low grade fuel is supplied, in which case it may be necessary to adjust the octane selector to avoid pinking, even with a clean engine.

Should the distributor have been disturbed, the ignition timing must be reset as follows:

1. Set the contact breaker point gap to .014 to .016 in. (0,35 to 0,40 mm) with the points fully open.
2. Rotate the engine in the running direction until the appropriate mark, see below, on the flywheel is in line with the pointer, with both valves on No. 1 cylinder closed.

3° BTDC—4 cylinder, 85 octane fuel	} United Kingdom use two-star grade fuel.
6° BTDC—4 cylinder, 90 octane fuel	
2° ATDC—6 cylinder, 7.8:1, 90 octane fuel	
2° BTDC—6 cylinder, 7.0:1, 83 octane fuel	

3. The distributor rotor will now correspond with No. 1 cylinder high tension lead terminal.
4. Set the octane selector so that the fourth line from the left-hand side of the calibrated slide is against the face of the distributor body casing.
5. Slacken the pinch bolt at the base of the distributor head, rotate the distributor bodily in the opposite direction to the arrow on the rotor arm until the contact breaker points are just opening with the fibre cam follower on the leading side of the cam; re-tighten the pinch bolt.

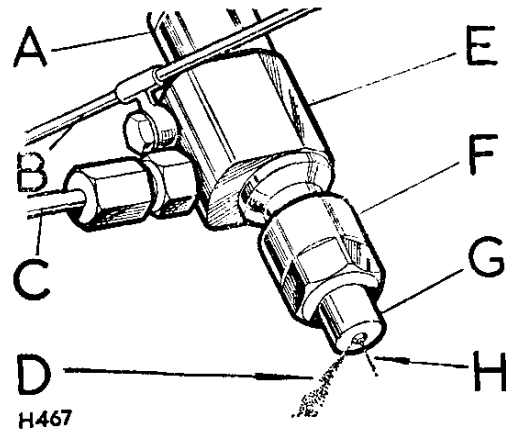


Flywheel markings

A—Timing pointer

Injection nozzle, Diesel models

- A—Cover nut
- B—Spill pipe
- C—Fuel inlet
- D—Auxiliary spray
- E—Body
- F—Nozzle retainer
- G—Nozzle
- H—Main spray



Fuel injectors—Every 12,000 miles (18,000 km). Diesel models **Absolute cleanliness is essential when handling fuel injectors.**

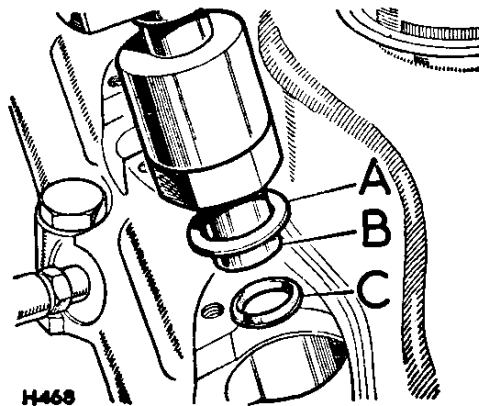
Nozzle holders and nozzles should not be dismantled unless proper testing and re-setting facilities are available. If a nozzle is found to be faulty, replace the complete unit.

The injectors are located in the top of the cylinder head on the right-hand side. Injectors may be removed for checking and adjustment as follows:

- (a) Disconnect the spill pipe at T-piece and slacken banjo bolts at nozzles. The feed pipes must be removed from the injectors and the pump, these pipes should be free at both ends; on no account must the pipes be bent to clear the union on the injector.
- (b) Remove the nuts retaining the clamp bar on the top of the injector and remove the bar.
- (c) Lift out the injectors, complete with spill pipe and copper washers. Remove the steel washers from inside the injector holes.
- (d) Fit spill pipe to new injectors, ensuring that no foreign matter is present. Do not fully tighten banjo bolts at this stage. Fit assembly of injectors and spill pipe to cylinder head, taking great care not to damage nozzle and also ensure that both new copper and steel washers are fitted. The steel washer must be fitted with the 'U' of the corrugation downwards.

Position of injector nozzle washers, Diesel models

- A—Copper washer
- B—Nozzle
- C—Steel washer



-
- (e) Replace the clamp bar and nuts. Tighten each nut alternately an equal amount to ensure that the injector goes into position evenly. Finally, tighten spill pipe banjo bolts.

Checking nozzles in engine, Diesel models

The first symptoms of nozzle trouble usually come under one or more of the following headings:

- 1—Cylinder knock;
- 2—Engine overheating;
- 3—Loss of power;
- 4—Smoky exhaust (black);
- 5—Increased fuel consumption.

To check the nozzles, proceed as follows:

- (a) With the engine running, release the fuel feed pipe union on each nozzle in turn.
- (b) If the injector being checked has been operating properly, there will be a distinct reduction in engine speed accompanied by obvious roughness, but a faulty injector will make less reduction to engine speed when its fuel pipe is loosened.

Do not assume, however, that the nozzles are the only cause of the trouble, as faulty valve timing, leaking valves, incorrect pump timing, dirty filters, etc., may all cause similar trouble.

Adjusting injectors, Diesel models

The use of a test pump is essential when adjusting injectors; we strongly recommend therefore, that adjustment required on injectors be carried out by your nearest Rover Distributor or Dealer or CAV Agent.

Great care should be taken to prevent the hands getting into contact with the spray, as the working pressure will cause the fuel to penetrate the skin with ease.

Heater plugs, Diesel models

The heater plugs do not require any maintenance. However, if at any time when the heater plug is used, the warning light glows very brightly, a short circuit in the system is indicated. No light will indicate an open circuit. This should receive attention at your nearest Rover Distributor or Dealer.

Great care must be taken not to twist the centre terminal when removing heater plug leads.

Fuel and injection system, Diesel models

Absolute cleanliness is essential when handling any part of the fuel injection system.

The fuel system comprises the fuel tank, pipe lines, sediment bowl filter, mechanically operated pump, paper element type filter, injectors and injection pump. It is most important that the system be kept clean and free from leaks.

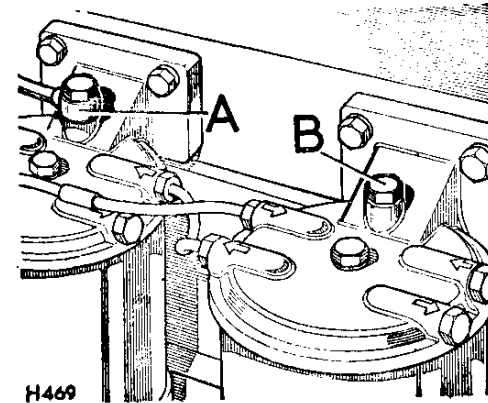
Priming the fuel system, Diesel models

(Single or twin filter system)

Important. On Forward Control Diesel models all priming must be carried out at the distributor pump, see items 8 to 12 overleaf.

A—When the filter bowl has been cleaned or the paper element changed on **either or both** fuel filters the system must be primed as follows:

1. Do not attempt to start the engine hoping to draw the fuel through in this way, otherwise the full priming procedure will be necessary.
2. Slacken the bleed pipe or air vent screw as the case may be, on the top of the filter which has had the replacement element fitted.
3. Operate the hand priming lever on the mechanical pump, until fuel free from bubbles emerges.

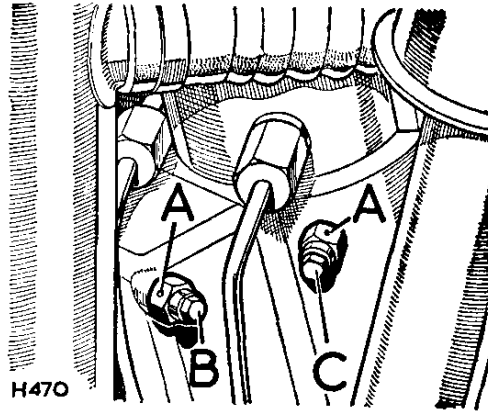


Air vent on filter, Diesel models. Twin filter system illustrated

A—Bleed pipe
B—Air vent screw

Priming the distributor pump, Diesel models

- A—Fuel orifice
- B—Air vent screw on distributor
- C—Air vent screw on distributor control cover



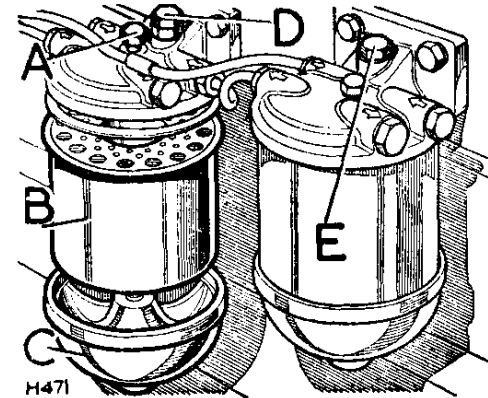
4. Tighten the bleed pipe or air vent screw.
 5. Operate the hand priming lever once or twice to clear the last bubbles of air into the filter bleed pipe.
 6. Start engine in normal way and check for leaks.
- B**—When fuel system has been completely emptied proceed as follows:
7. Carry out operations above, 1 to 5 inclusive.
 8. Release air vent screw 'B' on distributor body.
 9. Operate the fuel pump hand priming lever until fuel free of air emerges.
 10. Retighten the air vent screw.
 11. To ensure that all air is exhausted from the pump it may also be necessary to slacken air vent screw 'C' in the distributor control cover and repeat items 9 and 10.
 12. Start the engine in the normal way and check for leaks.
- C**—When distributor pump only has been drained it is only necessary to carry out operations 8 to 12 inclusive.

Always ensure that fuel pump lever is on the bottom of the operating cam when priming the fuel system, otherwise maximum movement of the priming lever will not be obtained.

Fuel filter, paper element type—One filter, every 12,000 miles (18,000 km); Two filters, 1st every 12,000 miles (18,000 km), 2nd every 24,000 miles (38,000 km)

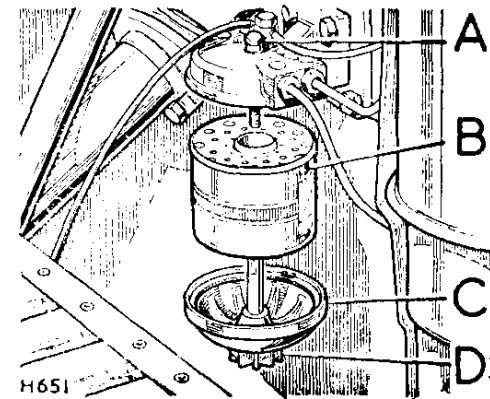
Proceed as follows:

1. Support element holder and unscrew the special bolt on the top of the filter, the element holder can now be removed.
2. Remove and discard the used element.
3. Wash the element holder in petrol or fuel oil.
4. If necessary renew both the large rubber washer and the small rubber washer in the filter top, also renew the large rubber washer in the element holder.
5. Push the new element on to the filter top spigot with the perforated holes in the element to the top.
6. Fit the element holder to the bottom of the element, and secure with the special bolt.
7. Prime the system and check for fuel leaks.



Paper element filter, bonneted control Diesel models. Twin filter system illustrated. Filters on dash

- A—Element retaining bolt
- B—Element
- C—Element holder
- D—Bleed pipe
- E—Air vent screw

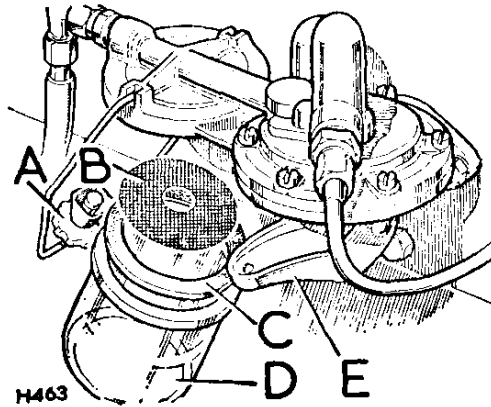


Paper element filter, Forward Control Diesel models. Filter at rear engine

- A—Element retaining bolt
- B—Element
- C—Element holder
- D—Water drain plug

**Sediment bowl,
'Regular' and 'Long'
Diesel models**

- A—Retainer
- B—Gauze filter
- C—Sealing washer
- D—Sediment bowl
- E—Hand priming lever



Sediment bowl—Every 12,000 miles (18,000 km). 'Regular' and 'Long' Diesel models

The fuel pump sediment bowl provides an additional filter between the pump and the paper element filter.

Clean as follows:

1. Remove the glass bowl by slackening the thumb-screw and swinging the wire retainer aside.
2. Remove the gauze filter from the body of the unit and wash it and the bowl in petrol or fuel oil.
3. Ensure that the sealing washer is in good condition.
4. Replace the gauze correctly over the square inlet nozzle.
5. Fill glass bowl with fuel oil, refit bowl, re-position the wire retainer and tighten thumb-screw.
6. Prime by operating the pump hand lever. Air in the system will be expelled through the air bleed pipe on top of the container for the paper element fuel filter.

Fuel sedimenter—Every month, drain off water; every 12,000 miles (18,000 km), dismantle and clean. Forward Control Diesel models

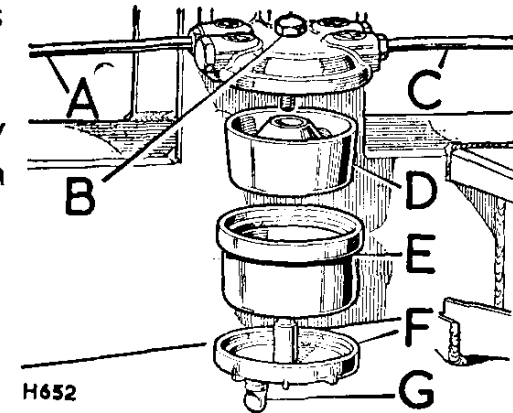
The sedimenter increases the working life of the fuel filter by removing the larger droplets of water and larger particles of foreign matter from the fuel.

Drain off water as follows:

1. Slacken off drain plug to allow water to run out.
2. When pure diesel fuel is emitted, tighten drain plug.

Dismantle and clean as detailed below:

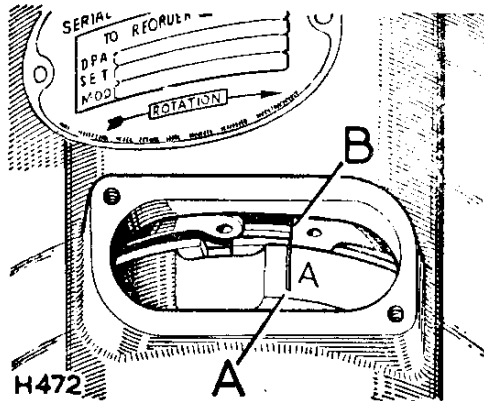
1. Disconnect fuel pipe inlet pipe at sedimenter and raise pipe above level of fuel tank to prevent draining from tank. Support in this position.
2. Support sedimenter bowl and unscrew special bolt on top of unit. The lower chamber, bowl and element can now be removed.
3. Clean all parts in petrol.
4. Fit new oil seals and reverse removal procedure.
5. Prime the system and check for air leaks.



Fuel sedimenter
 A—Outlet pipe
 B—Retainer bolt
 C—Inlet pipe
 D—Element
 E—Bowl
 F—Lower chamber
 G—Water drain plug

Injection pump timing marks correctly aligned

A—Timing mark
B—Straight edge of timing circlip



Distributor pump, Diesel models

This unit is correctly set on leaving the factory and requires no further adjustment. It is lubricated by the diesel fuel and does not require any maintenance in this respect.

Should any trouble be experienced with the distributor pump, consult your nearest CAV Agent.

If for any reason the distributor pump has been removed, it must be refitted and timed as follows:

1. Align the appropriate timing mark on the flywheel with the pointer as detailed in the Land-Rover Workshop Manual.
2. Remove the inspection cover from the injection pump and rotate the spindle until the line marked 'A' on the driving plate is aligned with the straight edge of timing circlip.
3. Offer the pump to the engine and engage in the splined shaft. With a small mirror, observe the setting through inspection aperture in injection pump and make any final necessary adjustment by turning the pump body to align the timing circlip as detailed above.

Hold the pump drive plate and press the skew-drive gear back against the driving side of the teeth whilst final adjustments are made and the pump secured, in order to avoid any timing errors.

4. Recheck the timing by turning the crankshaft in the direction of rotation until both valves of number one cylinder are closed and the piston is ascending the bore on the compression stroke; continue to turn the crankshaft slowly.

With a small mirror, observe that the timing mark 'A' on the pump drive plate aligns with the straight edge of timing circlip.

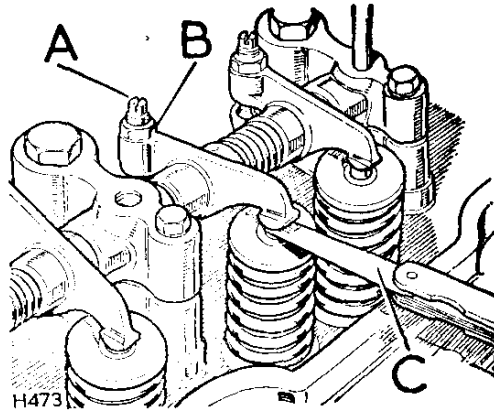
When the above condition is obtained, the flywheel timing mark 16° should be exactly in line with the flywheel housing pointer. In this way any slight timing error is magnified by the 2:1 ratio of the camshaft to crankshaft.

An error of a given width on the pump marking will be twelve times that width if transferred to the flywheel.

If the flywheel is inadvertently turned too far and the timing mark on the pump drive plate goes past the appropriate timing point on the circlip, the operation must be repeated.

Tappet adjustment, 4-cylinder models

- A—Adjusting screw
- B—Locknut
- C—Feeler gauge



Tappet adjustment—Every 8,000 miles (12.000 km)

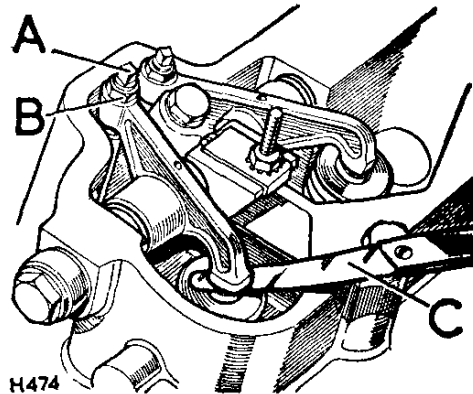
The correct clearance is: 4-cylinder models, inlet and exhaust, .010 in. (0,25 mm) engine hot. 6-cylinder models, inlet .006 in. (0,15 mm) engine hot and exhaust .010 in. (0,25 mm) with the engine hot or cold.

To carry out tappet adjustment, proceed as follows:

1. Rotate the engine in the running direction until the valve receiving attention is fully open and then move the engine one complete turn, to bring the tappet on to the back of the cam.
2. Check the tappet clearance with a feeler gauge. If adjustment is required, slacken the locknut and rotate the tappet adjusting screw until the clearance is correct; re-tighten the locknut, taking care to ensure that this operation does not upset the clearance.
3. Repeat for the other valves in turn.

Tappet adjustment, 6-cylinder models

- A—Adjusting screw
- B—Locknut
- C—Feeler gauge



Fan belt adjustment—Every 4,000 miles (6,000 km). All except Forward Control Diesel models

Check by thumb pressure between the fan and crankshaft pulleys at point marked 'B'. Movement should be $\frac{5}{16}$ in. to $\frac{7}{16}$ in. (8 to 11 mm).

If necessary adjust as follows:

1. Slacken the pivot bolts securing the dynamo to the mounting bracket, slacken the adjusting bolt.
2. Pivot the dynamo inwards or outwards as necessary and adjust until the correct belt tension is obtained.
3. Tighten adjusting and pivot bolts.

Dynamo, fan and exhauster belt adjustment—Every 4,000 miles (6,000 km). Forward Control Diesel models

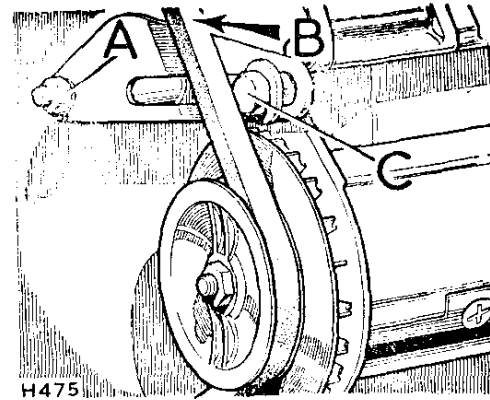
Check by thumb pressure between:

Dynamo belt; dynamo and crankshaft pulleys.

Fan belt; jockey and crankshaft pulleys.

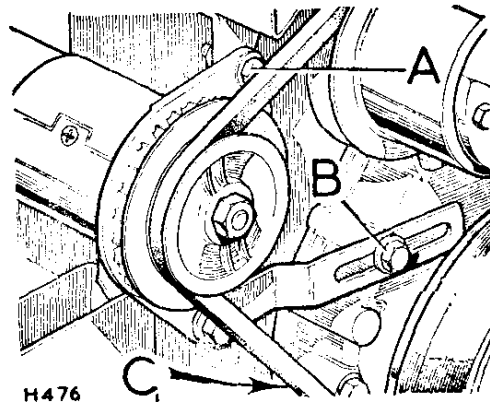
Exhauster belt; jockey and exhauster pulleys.

At point marked 'A' or 'C' as applicable, movement should be $\frac{5}{16}$ in. to $\frac{7}{16}$ in. (8 to 11 mm).



Fan belt adjustment, 'Regular' and 'Long' models
4-cylinder model illustrated

- A—Adjusting bolt
B—Pivot
C—Check at this point, $\frac{5}{16}$ in. to $\frac{7}{16}$ in. (8 to 11 mm) movement

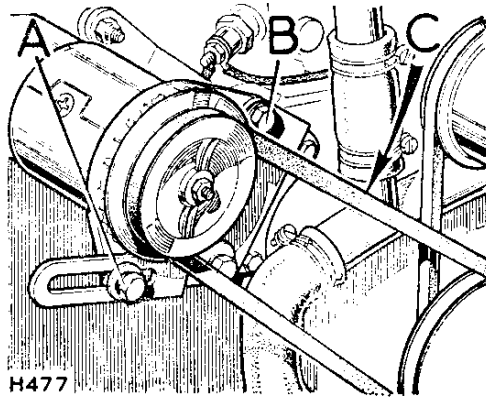


Fan belt adjustment, Forward Control Petrol models

- A—Adjusting bolt
B—Pivot bolt
C—Check at this point, $\frac{5}{16}$ in. to $\frac{7}{16}$ in. (8 to 11 mm) movement

**Dynamo belt adjustment,
Forward Control
Diesel models**

- A—Adjuster bolt
- B—Pivot bolt
- C—Check at this point,
 $\frac{1}{8}$ to $\frac{7}{16}$ in. (8 to 11
mm) movement

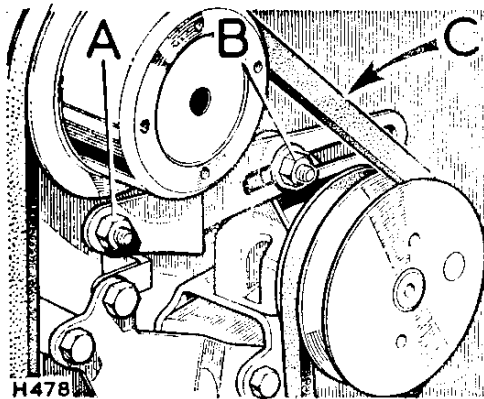


Dynamo belt, Forward Control Diesel models

1. Slacken the pivot bolts securing the dynamo, slacken the adjusting bolts.
2. Pivot the dynamo inwards or outwards as necessary and adjust until correct belt tension is obtained.
3. Tighten adjusting and pivot bolts.

**Fan belt adjustment,
Forward Control
Diesel models**

- A—Pivot bolt
- B—Adjuster bolt
- C—Check at this point,
 $\frac{1}{8}$ to $\frac{7}{16}$ in. (8 to 11
mm) movement



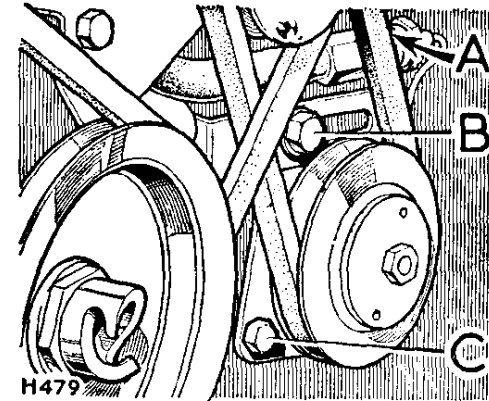
Fan belt, Forward Control Diesel models

1. Slacken the two adjusting bolts securing the jockey pulley.
2. Pivot the pulley inwards or outwards as necessary and adjust until the correct tension is obtained.
3. Tighten jockey pulley adjusting bolts.

Exhauster belt, Forward Control Diesel models

1. Slacken the adjusting bolts securing the exhauster.
2. Pivot the exhauster upwards or downwards as necessary and adjust until the correct tension is obtained.
3. Tighten the exhauster securing bolts.

This operation must always be carried out after adjusting the fan belt.



Exhauster belt adjustment, Forward Control Diesel models

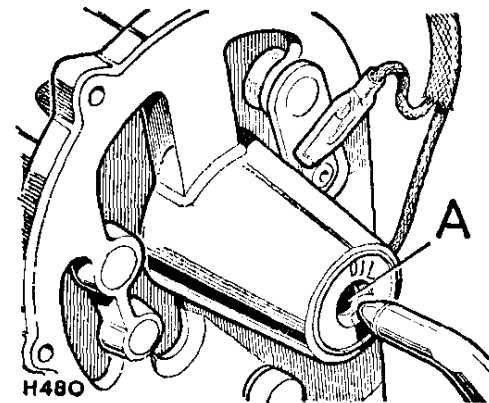
A—Check at this point, $\frac{5}{16}$ to $\frac{7}{16}$ in. (8 to 11 mm) movement

B—Adjuster bolt

C—Pivot bolt

Dynamo lubrication—Every 12,000 miles (18,000 km)

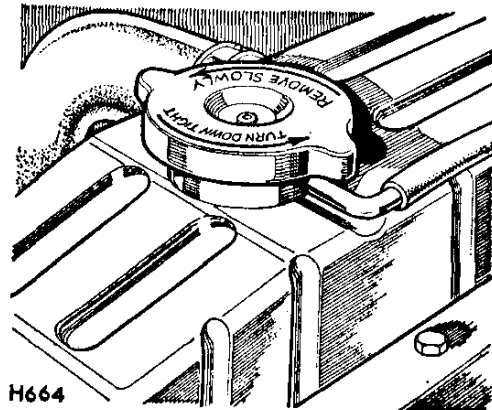
Lubricate at the commutator end bearing by inserting the nozzle of a pump type oil can in the small central hole and injecting just sufficient engine oil to moisten the lubricating pad.



Dynamo lubrication

A—Oil hole

Radiator filler cap



Radiator water level—Daily or weekly, depending on operating conditions, and at every maintenance inspection

The radiator filler cap is under the bonnet panel.

Diesel models

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

All models

The cooling system is pressurised and care must be taken when removing the radiator filler cap, especially when the engine is hot.

When removing the filler cap, first turn it anti-clockwise to the stop and allow all pressure to escape, before pressing it down and turning further in the same direction to lift it off.

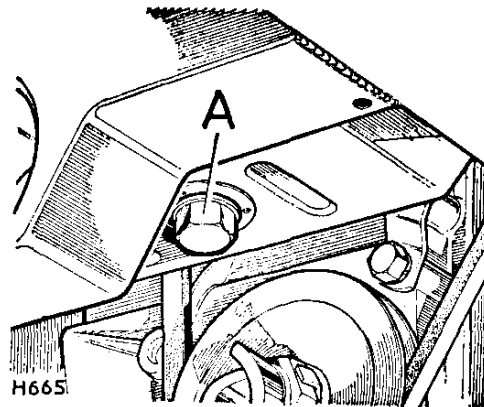
When replacing the filler cap, it is important that it is tightened down fully, not just to the first stop. Failure to tighten the filler cap properly may result in water loss, with possible damage to the engine through overheating.

6-cylinder 'Long' models have a semi-sealed cooling system, that is, an overflow bottle attached to the left-hand side of the radiator.

The water level in the cooling system is checked at the radiator only and topping-up is also carried out in the normal manner through the radiator filler. The pipe in the overflow bottle should always be submerged in water.

Radiator drain plug

A—Drain plug, at right-hand side



With a cold engine the correct water level is $\frac{1}{2}$ to $\frac{3}{4}$ in. (12 to 19 mm) below the bottom of the filler neck. For capacities see Data Section.

Use soft water wherever possible; if the local water supply is hard, rainwater should be used.

Frost precautions

In cold weather, when the temperature may drop to or below freezing point, precautions must be taken to prevent freezing of the water in the cooling system.

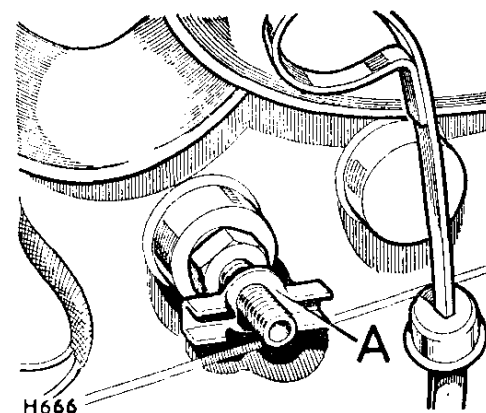
As a thermostat is fitted in the system, it is possible for the radiator block to freeze in cold weather even though the engine running temperature is quite high; for this reason, the use of an anti-freezing mixture is essential.

Only anti-freeze solutions conforming to British Standard No. BS 3152 must be used.

When the temperature is between 32°F and 0°F (0°C and minus 18°C), use one part of anti-freeze to three parts of water.

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.
3. Pour in approximately one gallon (4,5 litres) of water, add solution, then top up with water to within $\frac{1}{2}$ to $\frac{3}{4}$ in. (12 to 19 mm) below bottom of filler neck.
4. Run the engine to ensure a good circulation of the mixture.

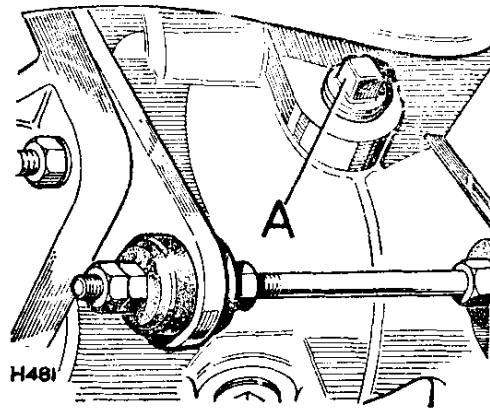


**Cylinder block
drain tap**

A — Drain tap,
4-cylinder at left-
hand side of engine
adjacent to dip-
stick, 6-cylinder at
right-hand side of
engine adjacent to
engine breather

Gearbox oil filler-level plug

A—Oil filler-level plug



During the winter months in Britain Land-Rovers leaving the Rover factory have the cooling system filled with 33 $\frac{1}{3}$ % of anti-freeze mixture. This gives protection against frost down to minus 25°F (minus 32°C). Cars so filled can be identified by the blue label affixed to the right-hand side of the windscreen and a blue label tied to the engine.

Main gearbox oil level—Every 4,000 miles (6,000 km)

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

The main gearbox and clutch withdrawal mechanism are lubricated as one unit. Check oil level and top up if necessary to the bottom of the filler/level plug hole.

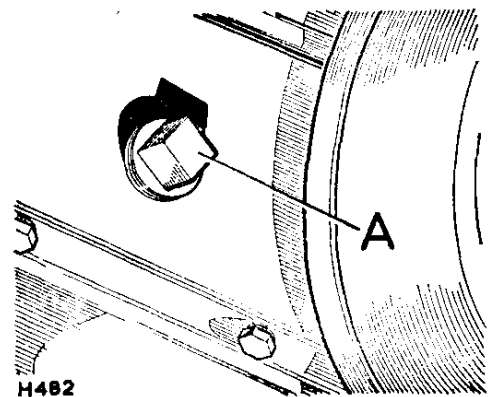
This plug is accessible from under the vehicle and can be seen from above when the rubber grommet is removed from the left-hand side of the gearbox cover.

Engine and gearbox components on the Forward Control models, are freely accessible upon removal of the engine cover in the cab, and/or the panel in the floor of the body.

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

Transfer box oil level

A—Filler-level plug



Transfer box oil level—Every 4,000 miles (6,000 km)

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

The transfer box and front wheel drive housing are lubricated as one unit. Check oil level and top up if necessary to the bottom of

the filler-level plug hole. The filler-level plug is in the rear face of the transfer box, it is accessible when the seat box centre panel is removed.

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

Main gearbox oil changes—Every 12,000 miles (18.000 km)

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 in the bottom of the gearbox casing.
2. Replace the drain plug and refill gearbox with the correct grade of oil.

The capacity is: $2\frac{1}{2}$ Imperial pints, 3 US pints, (1,5 litres).

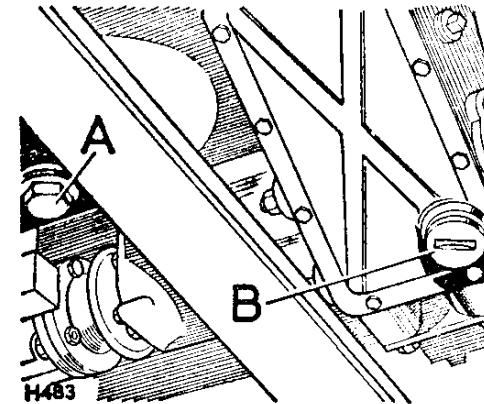
Transfer box oil changes—Every 12,000 miles (18.000 km)

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 in the bottom of the transfer box.
2. Replace the drain plug and refill transfer box with the correct grade of oil.

The capacity is $4\frac{1}{2}$ Imperial pints ($5\frac{1}{2}$ US pints, 2,5 litres).

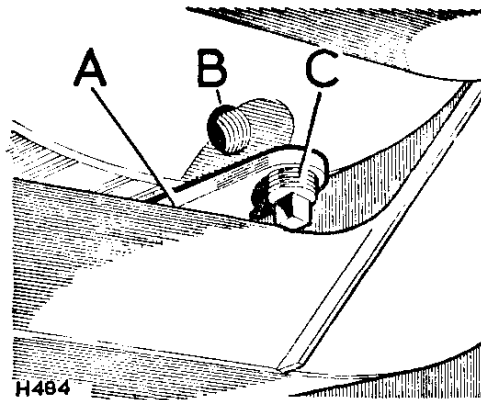


Gearbox and transfer box drain plug

A—Gearbox drain plug
B—Transfer box drain plug

Flywheel housing drain plug

- A—Bracket for plug
- B—Aperture for plug in flywheel housing
- C—Plug



Flywheel housing drain plug—Every 4,000 miles (6,000 km.)

When in use for wading

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.

The plug is screwed into a bracket adjacent to the drain hole, and should only be fitted when the vehicle is expected to do wading or very muddy work.

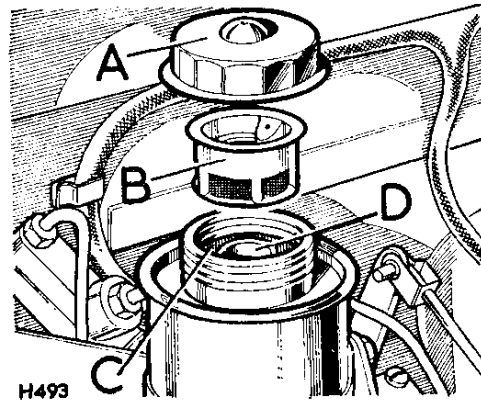
When the plug is in use it must be removed periodically and all oil allowed to drain off before the plug is replaced.

Clutch mechanism

Land-Rover models are fitted with a hydrostatic clutch, that is a clutch mechanism which is correctly set on initial assembly to give approximately $\frac{5}{16}$ in. (8 mm) free movement at the pedal pad, and which requires no adjustment throughout the life of the clutch plate.

Brake and clutch fluid reservoir, 'Regular' and 'Long' models

- A—Filler cap
- B—Filter
- C—Brake reservoir
- D—Clutch reservoir



Clutch fluid reservoir—Every 4,000 miles (6,000 km)

'Regular' and 'Long' models have a combined brake and clutch fluid reservoir mounted on the dash.

On Forward Control models there is a separate clutch fluid reservoir integral with the clutch master cylinder.

'Regular' and 'Long' models. Check fluid level in reservoir; top-up if necessary so that fluid just shows in bottom of filter.

Forward Control models. Check fluid level in reservoir, top up if necessary to bottom of filler neck.

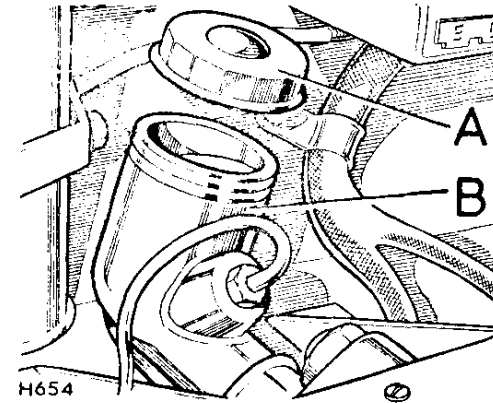
Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

If significant topping-up is required, check for leaks at master cylinder, slave cylinder and connecting pipe.

Bleeding the clutch system

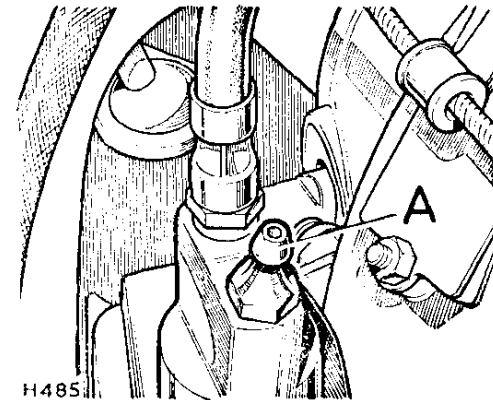
If the level of the fluid in the clutch reservoir is allowed to fall too low or if the pipe has been disconnected, the clutch will not operate correctly due to air having been absorbed in the system. This air lock must be removed by bleeding the hydraulic system at the slave cylinder.

1. Attach a length of rubber tubing to the bleed nipple and place the lower end of the tube in a glass jar.
2. Slacken the nipple and pump the clutch pedal, pausing at each end of each stroke, until the fluid issuing from the tube shows no sign of air bubbles when the outlet is held below the surface of the fluid in the jar.
3. Hold the tube under the fluid surface and tighten the bleed screw.
4. The fluid in the reservoir should be replenished throughout the operation to prevent another air-lock being formed, using only new fluid—Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3). Note particularly that on 'Regular' and 'Long' models, the fluid reservoir for the clutch is the small central tube in the combined reservoir.



**Clutch reservoir,
Forward Control
models**

- A—Filler cap
B—Clutch reservoir
and master
cylinder

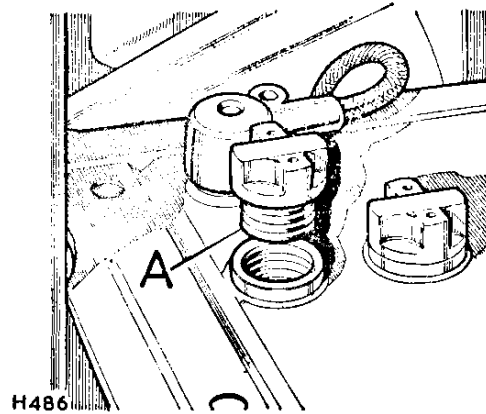


**Bleed nipple for clutch
slave cylinder**

- A—Bleed nipple

Battery acid level

A—Filler plug



Battery acid level—Every month and at every maintenance attention

Check weekly when operating under severe conditions.

The battery is located:

‘Regular’ and ‘Long’ 4-cylinder Petrol models—under bonnet at right-hand side.

6-cylinder ‘Long’ models—under left-hand front seat.

‘Regular’ and ‘Long’ Diesel models—one under bonnet at right-hand side, the other under the left-hand seat.

Forward Control models—below body, left-hand side of vehicle to rear of cab.

The specific gravity of the electrolyte should be checked at every maintenance attention. Readings should be:

Temperate climate below 80°F (26.5°C) 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 in the car should be checked.

Tropical climate above 80°F (26.5°C) 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 car should be checked.

Check acid level as follows:

1. Wipe all dirt and moisture from the battery top.
2. Remove the filler plugs. If necessary add sufficient distilled water to raise the level to the top of separators. Replace the filler plugs.

Avoid the use of a naked light when examining the cells.

In hot climates it will be necessary to top up the battery at more frequent intervals.

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.

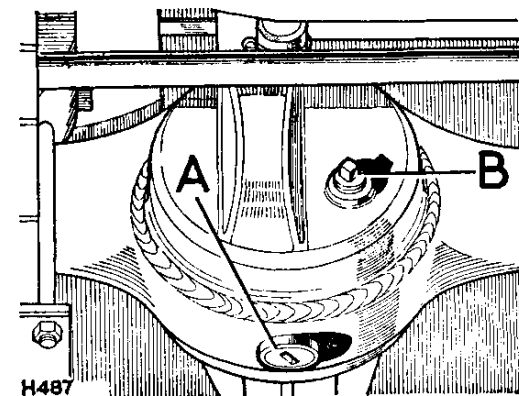
Battery terminals—Every 8,000 miles (12,000 km)

Remove battery terminals, clean, grease and refit. Replace terminal screw, do not overtighten. Do not use the screw for pulling down the terminal.

Front and rear differential oil level—Every 4,000 miles (6,000 km)

Check oil level and top up if necessary to the bottom of the filler plug hole. The rear axle filler-level plug is on the right-hand side of the differential casing and the front axle plug is at the front of the axle casing.

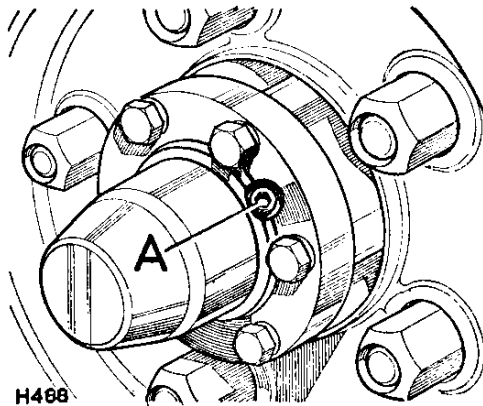
A second plug fitted at the rear of the front axle casing can be disregarded.



Front differential oil filler-level plug

A—Drain plug
B—Filler-level plug

Oil filler plug, rear axle hub
A—Oil filler plug



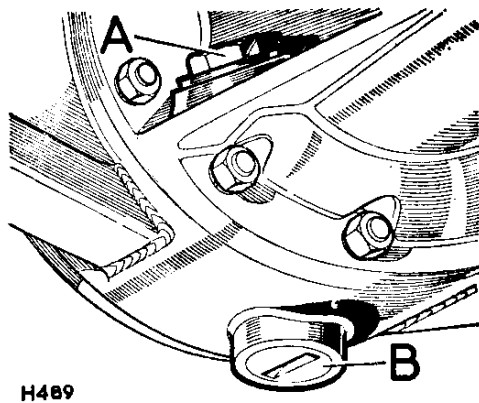
If significant topping up is required check for oil leaks at plugs, joint faces and oil seals adjacent to axle shaft flanges and propeller shaft driving flange.

Driving member, front and rear axle

The oil filler plug located in the driving member is for initial filling only. During normal running the oil level is maintained from the differential and the hub requires no further attention in this respect.

If the hub is replaced or has been stripped down for any purpose, it must be filled on assembly with one-third pint of the same grade of oil as used in the differential.

Rear differential oil filler-level plug
A—Filler-level plug
B—Drain plug



Front and rear differential oil changes—Every 12,000 miles (18,000 km)

To change the differential oil, proceed as follows:

1. Immediately after a run, when the oil is warm, drain off the oil by removing the drain plugs in the bottom of the axle casings.
2. Replace the drain plugs, remove filler-level plugs and refill with oil of the correct grade; the capacity is approximately:

‘Regular’ and ‘Long’ models

Front and rear differential—3 Imperial pints (3½ US pints, 1,75 litres)

Forward Control models

Front differential— $2\frac{1}{8}$ Imperial pints ($2\frac{1}{2}$ US pints, 1,2 litres);

Rear differential— $2\frac{5}{8}$ Imperial pints (3.1 US pints, 1,4 litres)

The drain plugs have slotted heads and can be removed with the aid of the single-ended spanner in the tool kit.

Swivel pin housing oil level—Every 4,000 miles (6.000 km)

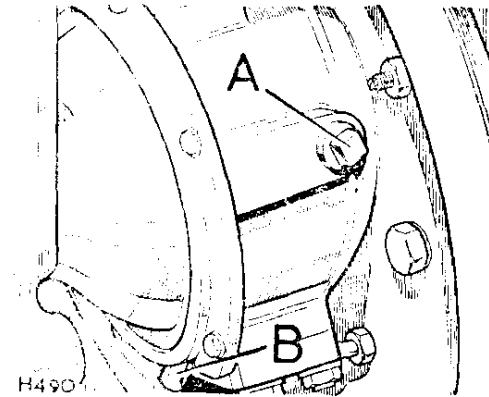
The front wheel drive universal joints, swivel pins and front hubs receive their lubrication from the swivel pin housings. Check oil level and top up if necessary to the bottom of the filler-level plug holes at the rear of the housings.

If significant topping up is required check for oil leaks at plugs, joint faces and oil seals.

Swivel pin housing oil changes—Every 12,000 miles (18.000 km)

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

Immediately after a run, when the oil is warm, remove the drain plug from the bottom of each housing; allow the oil to drain away completely and replace the plugs. Refill with oil of the correct grade through the filler-level plug holes; the capacity of each housing is approximately 1 Imperial pint, 1.2 US pints (0,5 litre).



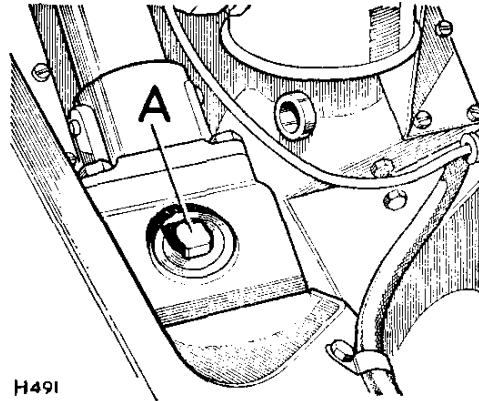
Swivel pin housing oil filler-level plug

A—Oil filler-level plug

B—Drain plug

Steering box oil filler plug

A—Oil filler plug



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Steering box oil level—Every 4,000 miles (6,000 km)

Check oil level and top up if necessary to the bottom of the filler-plug hole on the top of the cover plate. If significant topping up is required check for oil leaks at joint faces and rocker shaft oil seal. Access to the plug is gained by lifting the bonnet panel.

Steering ball joints—Every 4,000 miles (6,000 km)

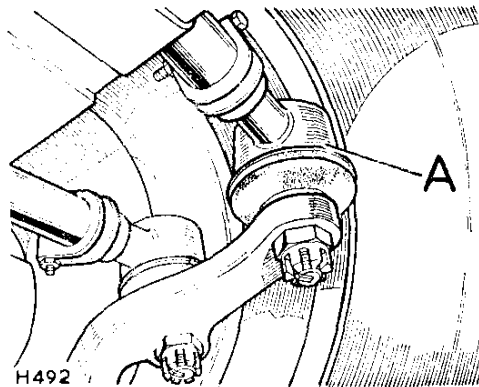
Check rubber boots daily when operating under arduous conditions.

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. 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.

Ball joints

A—Steering ball joint



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Brake system

The wheel brakes, operated by a pendant foot pedal, are of the hydraulic type with servo assistance on Forward Control and 6-cylinder 'Long' models. The handbrake operates a mechanical brake unit mounted on the output shaft from the transfer box.

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

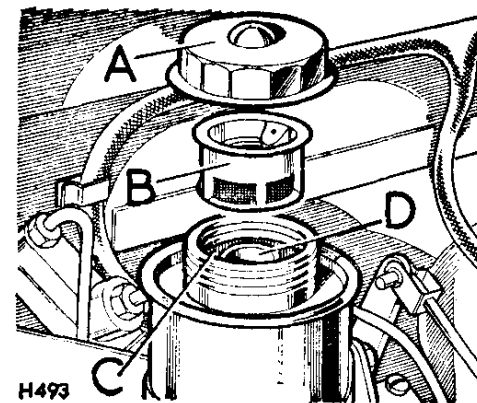
When used continuously under exceptionally wet and muddy conditions this operation may be advisable once, or even twice a week, to prevent the abrasive action of packed mud rapidly wearing out brake linings and drums.

Brake fluid reservoir—Every month and at every maintenance inspection. 'Regular' and 'Long' models

The combined fluid reservoir for the brakes and clutch is mounted above the foot pedals in front of the dash.

Check fluid level in brake reservoir, top up if necessary so that fluid just shows in bottom of filter. Make sure that both clutch and brake reservoirs are topped up. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

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



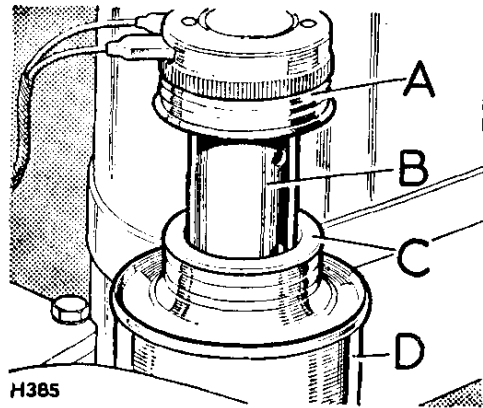
Brake and clutch fluid reservoir, 'Regular' and 'Long' models

- A—Filler cap
- B—Filter
- C—Brake reservoir
- D—Clutch reservoir

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Brake fluid reservoir Forward Control models

- A—Cap
- B—Float unit
- C—Filter
- D—Reservoir



Brake fluid reservoir—Every month and at every maintenance inspection. Forward Control models

The reservoir cap incorporates a float and level switch which operates the amber brake warning light, should the level in the reservoir fall below the safe limit, or if, under running conditions, there is insufficient vacuum in the brake servo unit to give servo assistance.

In certain circumstances, when starting from cold, the warning light will glow for some seconds while vacuum is building up in the servo unit.

Check fluid level in brake reservoir, top up if necessary. Use Castrol Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).

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

When removing reservoir cap do not disconnect the wires; care should be taken when withdrawing the float unit to ensure that the brake fluid does not drip on to the vehicle.

Check operation of reservoir level safety switch as follows:

Ignition 'on', handbrake 'off'; unscrew and lift filler cap 1 in. (25 mm), warning light should be illuminated.

If the warning light is not illuminated, the operation of the float unit and the wiring connections must be investigated.

If the warning light is illuminated during normal running, stop immediately and check:

1. Fluid level in reservoir.
2. That servo unit is giving assistance when brake pedal is depressed.
3. Diesel models only. Check tension of exhauster driving belt.

Any rectification necessary should be carried out by a Rover Distributor or Dealer.

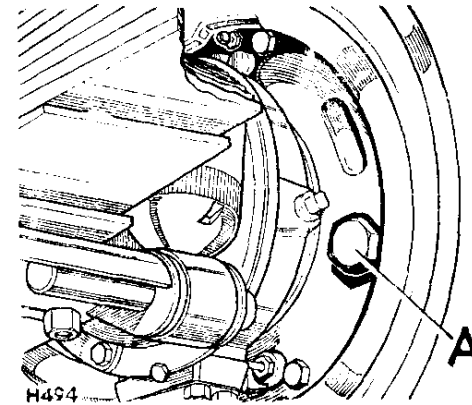
Wheel brake adjustment—Every 4,000 miles (6,000 km)

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

Proceed as follows:

88 models

1. Jack up each wheel in turn.
2. On the back face of the brake anchor plate will be found a hexagon adjustment bolt (A), which operates a snail cam bearing on the leading shoe. Only one of these is fitted to each wheel brake unit, thereby providing single-point adjustment.
3. Spin the wheel and rotate the adjuster bolt until the brake shoe contacts the drum, then ease the adjuster until the wheel again rotates freely.
4. Repeat for the other three wheels.



**Wheel brake
adjustment**

A—Adjustment bolt

109 and Forward Control models

5. Each shoe is independently set by means of a hexagon adjustment bolt operating through a serrated snail cam.
6. Ensure that the wheels rotate freely; slacken off the adjusters if necessary by turning anti-clockwise.
7. Turn the adjuster for each shoe clockwise until the shoe just brushes the brake drum, then slacken off two serrations.
8. Repeat for the other wheels in turn.

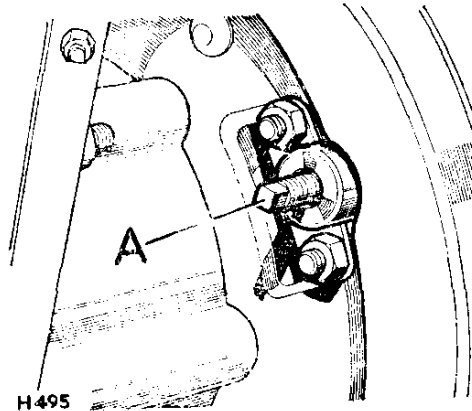
Transmission brake adjustment—Every 4,000 miles (6,000 km)

If hand brake movement is excessive, adjust as follows:

Release the hand brake. The adjuster protrudes from the front of the brake backplate and is accessible after removing the centre seat box panel or, in the case of Forward Control models, the floor panel in the body. Access may also be gained from beneath the vehicle. During rotation of the adjuster a click will be felt and heard at each quarter revolution. Rotate adjuster in a clockwise direction until the brake shoes contact the drum. Then unscrew the adjuster two clicks and give the hand brake a firm application to centralise the shoes.

Transmission brake adjustment

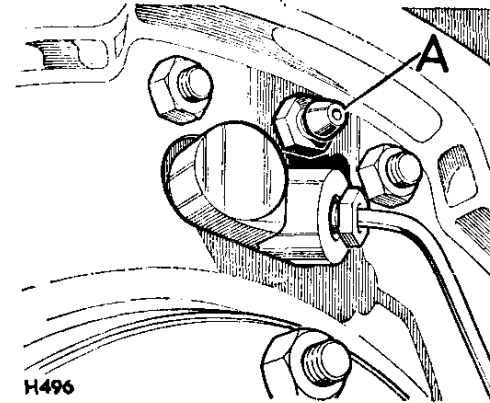
A—Adjuster bolt



Bleeding the brake system

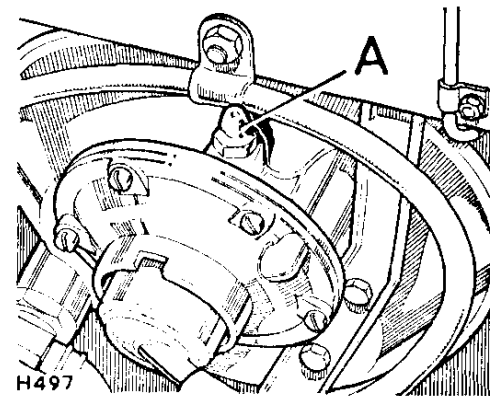
If the brakes feel spongy, this may be caused by air in the hydraulic system. This air must be removed by bleeding the hydraulic system at each wheel cylinder. Bleeding must always be carried out at all wheels. In addition it will be necessary to bleed the servo unit twice on Forward Control and 6-cylinder 'Long' models.

1. Slacken the adjusters off on all brake shoes.
2. Forward Control and 6-cylinder 'Long' models. Bleed the servo unit in a similar manner as detailed for the wheel cylinders.
3. Attach a length of rubber tubing to the bleed nipple on the wheel cylinder farthest from the brake pedal and place the lower end of the tube in a glass jar containing brake fluid.
4. Slacken the bleed screw and depress the brake pedal smartly, and release slowly, 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.
5. Hold the tube under the fluid surface and, with the foot brake fully depressed, tighten the bleed screw.
6. Repeat for the other three wheels in turn, finishing at the one nearest the brake pedal.



Brake bleed nipple

A—Bleed nipple



Servo bleed nipple

A—Bleed nipple

7. Re-bleed the servo unit.
8. Pump brake pedal until rear shoes are in firm contact with the brake drums.
9. While holding pedal depressed, adjust rear cam adjusters up to the shoes.
10. Release pedal and slacken rear adjusters until shoes just clear the drums.
11. Adjust front shoes in the normal manner.

The fluid in the reservoir should be replenished throughout the operation, to prevent another air lock being formed, using only new fluid. Castrol Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).

Note particularly that the fluid reservoir for the brake on 'Regular' and 'Long' models is the outer portion of the combined reservoir.

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

Rubber seals in brake system—Every 40,000 miles (64,000 km)

Renew all rubber seals in master cylinder, wheel cylinders and servo unit where applicable. This should be done every three years if mileage travelled is less than 40,000 (64,000 km). Refill with correct fluid, that is, Castrol Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).

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

Changing wheel positions—Every 4,000 miles (6,000 km)

The road wheels should be changed round as illustrated to equalise tyre wear.

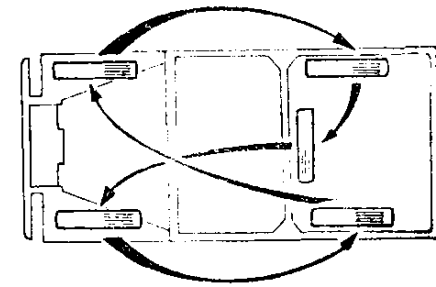
When cross-country tyres are used the 'V' tread should be directed to the front at the top.

Warning: Do not touch the outer ring of nuts on divided type wheels, unless the wheel is removed and the tyre fully deflated, or severe personal injury may result.

IMPORTANT. As the Land-Rover is fitted with a transmission brake, it is necessary before removing a road wheel to apply the hand brake and engage four-wheel drive.

This will ensure that the hand brake is operative on all four wheels.

Remember to engage two-wheel drive when the road wheel has been replaced.



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Changing wheel positions

Tyre pressures—Every month and at every maintenance attention

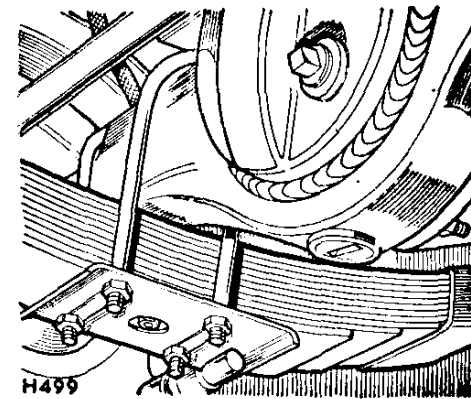
Maximum tyre life and performance will only be obtained if the tyres are maintained at the correct pressures.

Model			Normal				Emergency soft			
			Load under 550 lb. (250 kg)		Load over 550 lb. (250 kg)		Load under 550 lb. (250 kg)		Load over 550 lb. (250 kg)	
			Front	Rear	Front	Rear	Front	Rear	Front	Rear
88 models										
Avon or Dunlop 6.00 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Avon or Dunlop 7.00 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Avon or Dunlop 7.50 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	30 2,1	12 0,8	12 0,8	12 0,8	20 1,4
Michelin XS 7.50 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	30 2,1	12 0,8	12 0,8	12 0,8	20 1,4
109 models										
Avon or Dunlop 7.50 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	36 2,5	15 1,0	15 1,0	15 1,0	24 1,75
Michelin XS 7.50 x 16.00	lb/sq in. kg/cm ²		25 1,7	25 1,7	25 1,7	36 2,5	15 1,0	15 1,0	15 1,0	26 1,75
110 Forward Control models										
Avon or Dunlop 9.00 x 16.00	lb/sq in. kg/cm ²		28 2,0	18 1,3	35 2,4	30 2,1	12 0,8	12 0,8	12 0,8	15 1,0

1. Whenever possible, check with the tyres cold, as the pressure is about 2 lb (0,1 kg) higher at running temperature.
2. Always replace the valve caps, as they form a positive seal on the valves.
3. Any unusual pressure loss (in excess of 1 to 3 lb (0,05 to 0,20 kg) per month) should be investigated and corrected.
4. Always check the spare wheel, so that it is ready for use at any time.
5. At the same time, remove embedded flints, etc., from the tyre treads with the aid of a penknife or similar tool. Clean off any oil or grease on the tyres, using petrol sparingly.
6. 'Butyl' synthetic inner tubes are fitted and all repairs must be vulcanised.

Body, propeller shaft and road springs—Every 12,000 miles (18.000 km)

Check tightness of body securing bolts, propeller shaft bolts, road spring leaf clips and 'U' bolt nuts.

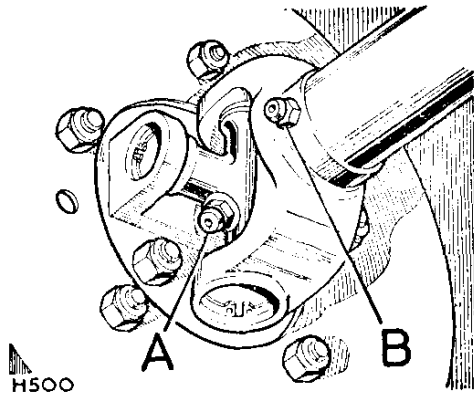


Road springs

Propeller shaft lubrication

A—Nipple for sliding portion. Plug on front shaft

B—Nipple for universal joint



Propeller shaft lubrication—Every 4,000 miles (6,000 km)

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

Front propeller shaft sliding portion—Every 24,000 miles (36,000 km)

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

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

Headlamp beam setting—Every 8,000 miles (12,000 km)

This operation is best done with special equipment and should be carried out by your local Rover Distributor or Dealer.

Oilcan lubrication—Every 12,000 miles (18,000 km)

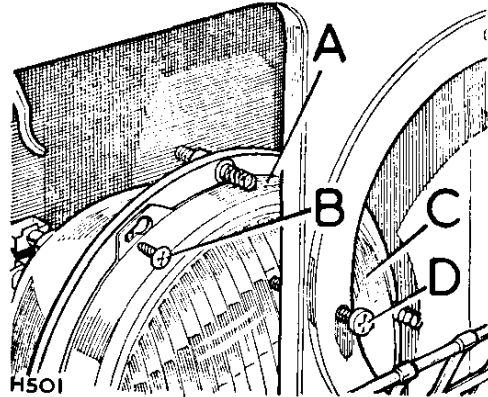
Apply a few spots of oil to throttle linkage, hand brake linkage, door locks, etc.

PART TWO

GENERAL INFORMATION

Headlamp light unit replacement

- A—Retaining rim
- B—Retaining screw for rim
- C—Light unit
- D—Retaining screw for headlamp



This section of the book gives details of headlamp light unit and bulb changing and circuit diagrams.

Headlamps

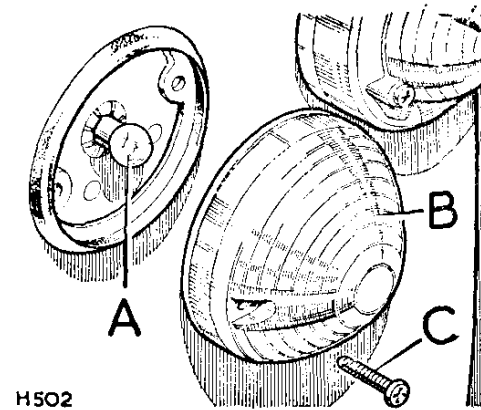
To replace light unit or bulb:

1. LH lamp. Remove the two screws retaining the name plate.
2. Remove name plate and lift grille off the bottom retainers.
3. Bulb type headlamp. LH and RH lamps. Disconnect plug at rear and release spring clip. Remove bulb holder; the bulb can then be replaced and the unit reassembled.
4. Sealed beam type headlamp. Disconnect plug at the rear and support unit. Unscrew the three Philips recessed-head screws on grille panel, and lift out sealed beam unit.
5. Fit new sealed beam unit. Reassemble and tighten Philips recessed-head screws fully.

Side, tail and stop lamps (flasher lamps when fitted)

To replace a bulb:

1. Remove rim retaining screws, lever the rubber bead away from the lamp and remove the rim and glass from the bottom first.
2. Renew the bulb, move the rubber bead aside, locate the rim at the top of the lamp and press it into position.
3. Finally position the bead so that it fits snugly round the rim.
4. Replace rim retaining screws.



Side, tail and stop lamp bulb replacement

A—Bulb
B—Lens
C—Screw retaining lens

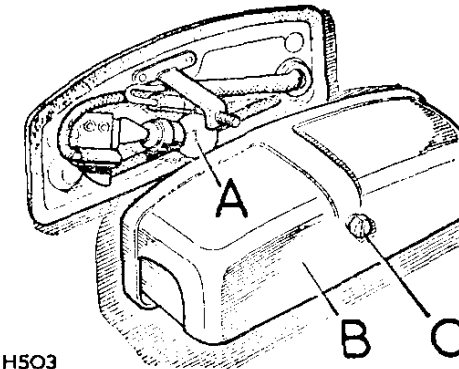
H502

Rear number plate illumination lamp (where applicable)

To replace the bulb:

1. Remove the securing screw and the cover; the bulb is then accessible in the lamp body.

On basic models the rear number plate illumination lamp is incorporated in the stop tail lamp.



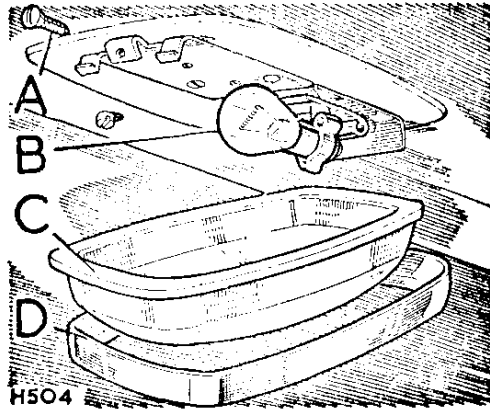
Rear number plate illumination lamp

A—Bulb
B—Cover
C—Retaining screw for cover

H503

Interior light

- A—Screw retaining cover
- B—Bulb
- C—Cover
- D—Rim



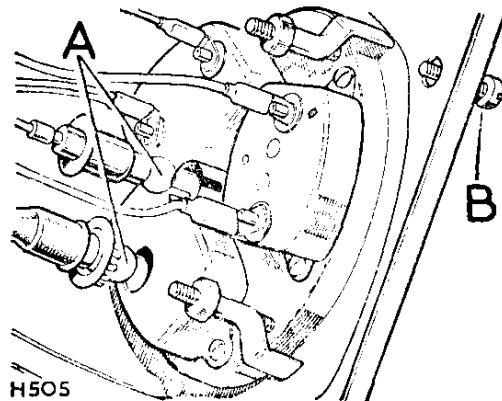
Interior light (where applicable)

To replace the bulb:

1. Remove screw retaining cover.
2. Replace bulb and refit cover.

Warning lights

- A—Bulbs
- B—Screw retaining instrument panel



Warning lights

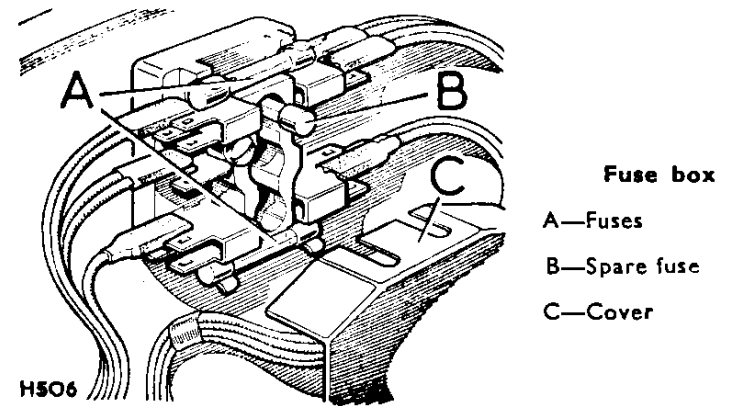
To remove warning lights:

1. Remove screws retaining instrument panel.
2. Bulbs can then be replaced as necessary.

Fuses

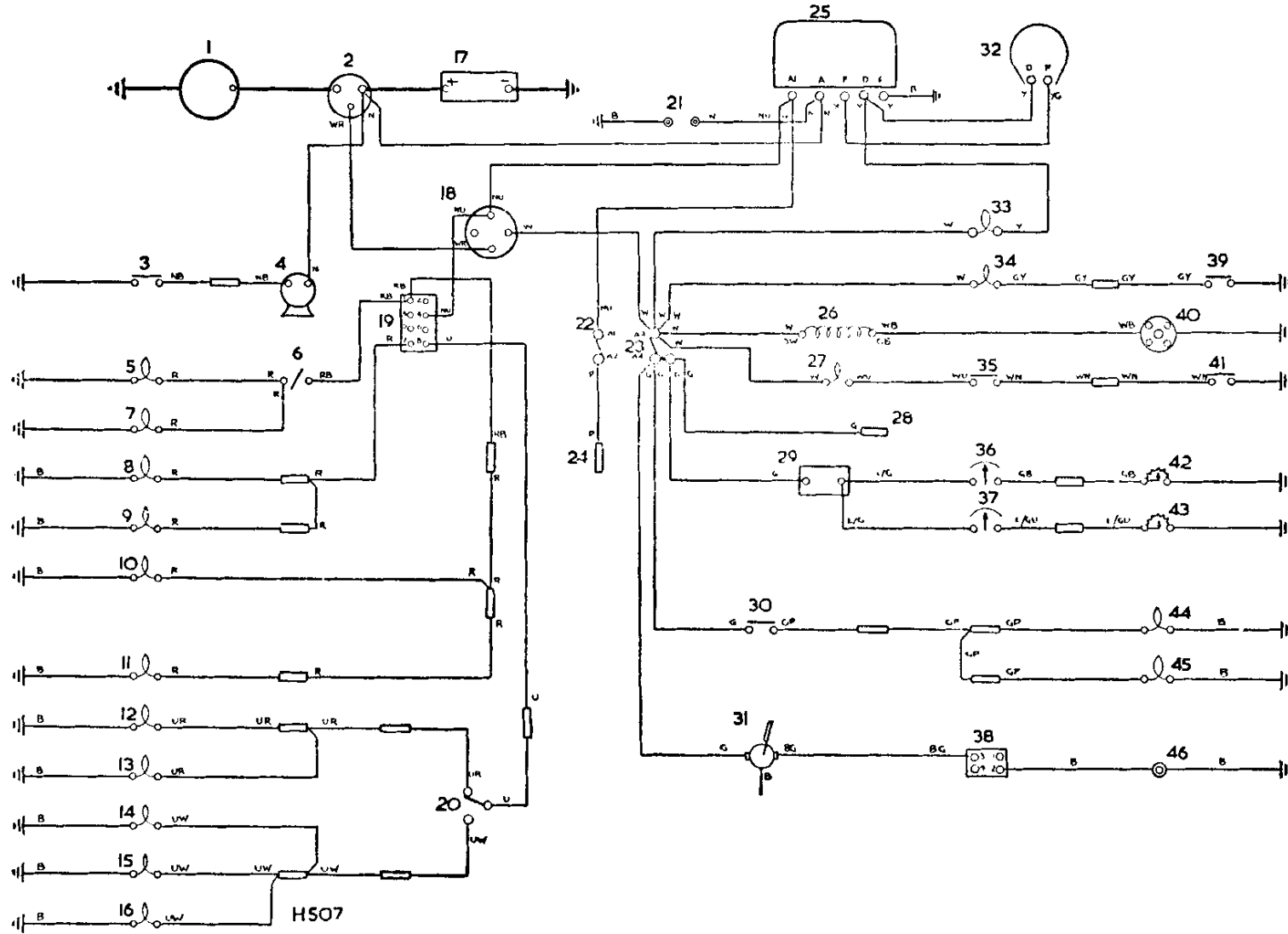
The fuses are located on the bulkhead under the bonnet. To replace a fuse:

1. The cover should be pulled off.
2. Replace fuse as required:



Fuse number	Fuse protects	Fuse, Amps
A3–A4	Windscreen wiper, fuel tank level unit and stop lights	35
A1–A2	Interior lamps, fog lamps, etc., as applicable	35

Two spare fuses are carried in the fuse box; only 35 amp cartridge type fuses should be used as replacements.



Circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Petrol models, negative earth

Key to circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Petrol models, negative earth

- | | |
|--------------------------------------|---|
| 1 Starter motor | 27 Warning light, choke |
| 2 Solenoid, starter motor | 28 Feed, flasher lights |
| 3 Horn push button | 29 Voltage stabiliser, fuel gauge and temperature gauge |
| 4 Horn | 30 Switch, stop lamp |
| 5 Panel light, speedometer | 31 Wiper motor |
| 6 Switch, panel light | 32 Dynamo |
| 7 Panel light, instruments | 33 Warning light, ignition |
| 8 Side lamp, RH | 34 Warning light, oil pressure |
| 9 Side lamp, LH | 35 Switch, cold start on control |
| 10 Tail lamp, RH | 36 Fuel gauge |
| 11 Tail lamp, LH | 37 Temperature gauge |
| 12 Headlamp, RH, dipped beam | 38 Switch, wiper |
| 13 Headlamp, LH, dipped beam | 39 Switch, oil pressure |
| 14 Headlamp, LH, main beam | 40 Distributor |
| 15 Headlamp, RH, main beam | 41 Switch, cold start in cylinder head |
| 16 Warning light, headlamp main beam | 42 Fuel tank unit |
| 17 Battery, 12 volt | 43 Temperature transmitter unit |
| 18 Switch, ignition and starter | 44 Stop lamp, RH |
| 19 Switch, lights | 45 Stop lamp, LH |
| 20 Switch, headlamp dip | 46 Socket, wiper lead |
| 21 Inspection sockets | |
| 22 Fuse, A1-A2 (35 amp) | |
| 23 Fuse, A3-A4 (35 amp) | |
| 24 Feed, interior light | |
| 25 Regulator box | |
| 26 Ignition coil | |

Snap and Lucar connections —  —

Earth connections —  —

Cable colour code

B—Black

P—Purple

W—White

R—Red

N—Brown

Y—Yellow

U—Blue

G—Green

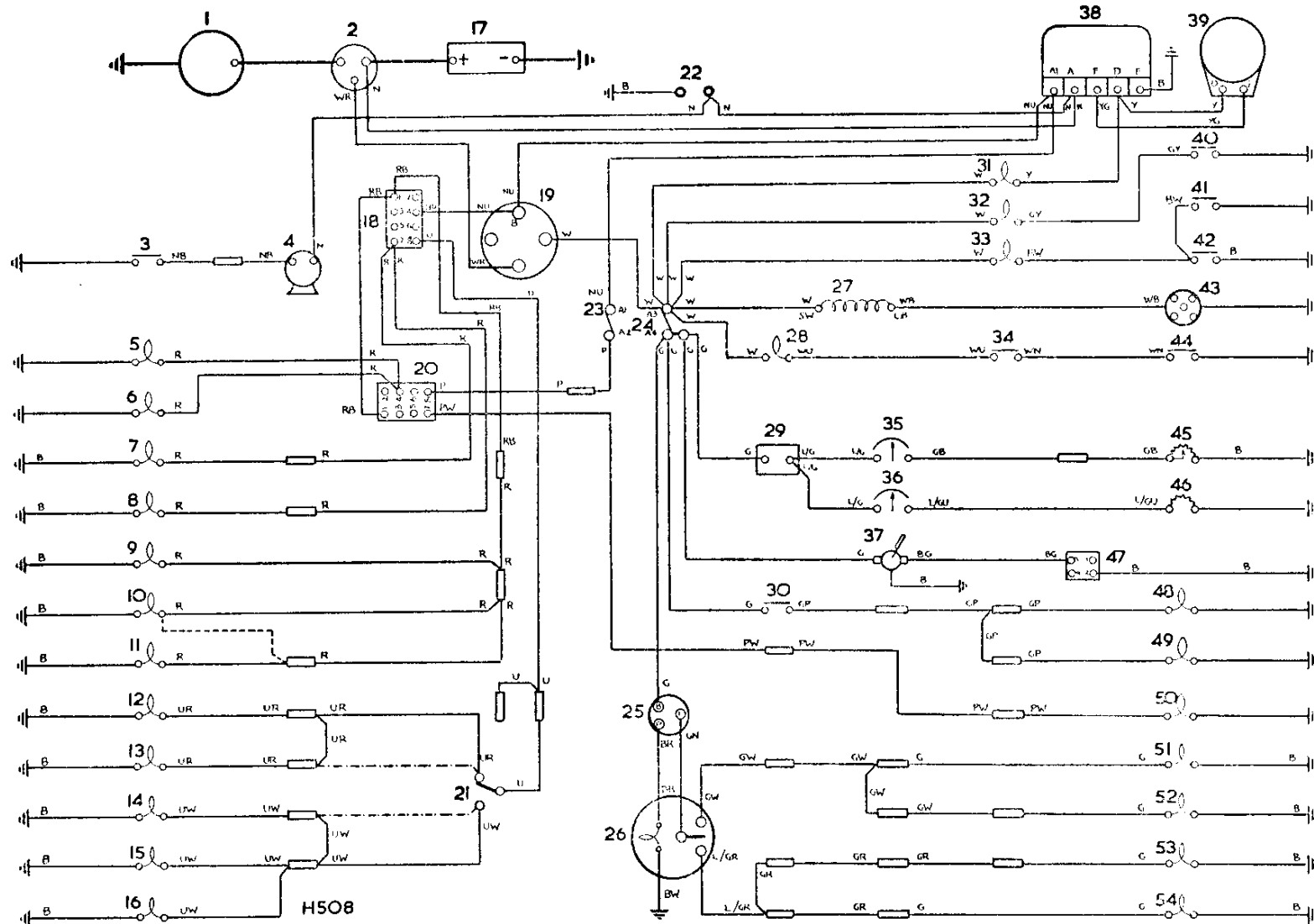
L—Light

Key to circuit diagram, 6-cylinder 'Long' and Station Wagon Petrol models, negative earth

- | | |
|---------------------------------------|---|
| 1 Starter motor | 28 Voltage stabiliser, fuel gauge and temperature gauge |
| 2 Solenoid, starter motor | 29 Switch, stop lamp |
| 3 Horn push-button | 30 Feed, flasher lights (where fitted) |
| 4 Horn | 31 Warning light, ignition |
| 5 Panel illumination | 32 Warning light, cold-start |
| 6 Panel illumination | 33 Warning light, oil pressure |
| 7 Side lamp, RH | 34 Dual fuel pump |
| 8 Side lamp, LH | 35 Switch, wiper |
| 9 Tail lamp, RH | 36 Switch, cold-start, on control |
| 10 Tail lamp, LH | 37 Ignition coil |
| 11 Headlamp, RH dipped beam | 38 Fuel gauge |
| 12 Headlamp, LH dipped beam | 39 Water temperature indicator |
| 13 Headlamp, LH main beam | 40 Switch, oil pressure |
| 14 Warning light, main beam | 41 Switch, cold-start, in cylinder head |
| 15 Headlamp, RH main beam | 42 Distributor |
| 16 Battery | 43 Socket, wiper lead |
| 17 Switch, lights | 44 Fuel tank unit |
| 18 Switch, panel lights | 45 Water temperature transmitter |
| 19 Switch, headlamp dip | 46 Stop lamp, LH |
| 20 Inspection lamp sockets | 47 Stop lamp, RH |
| 21 Fuse, A1-A2 | |
| 22 Feed, interior light, where fitted | Snap and Lucar connections — □ — |
| 23 Regulator box | Earth connections via terminals or fixing bolts — \|\|\| \|\|\| \|\|\| |
| 24 Switch, ignition and starter | Earth connections via cables — ^B \|\|\| \|\|\| \|\|\| |
| 25 Fuse, A3-A4 | |
| 26 Dynamo | |
| 27 Wiper motor | |

Cable colour code

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



Circuit diagram, 4-cylinder Forward Control Petrol models, negative earth

Key to circuit diagram, 4-cylinder Forward Control Petrol models, negative earth

- | | |
|---|---|
| 1 Starter motor | 31 Warning light, ignition |
| 2 Solenoid, starter motor | 32 Warning light, oil pressure |
| 3 Horn push button | 33 Warning light, brake fluid reservoir |
| 4 Horn | 34 Switch, cold start on control |
| 5 Panel light, speedometer | 35 Fuel gauge |
| 6 Panel light, instruments | 36 Temperature gauge |
| 7 Side lamp, LH | 37 Wiper motor |
| 8 Side lamp, RH | 38 Regulator box |
| 9 Tail lamp, RH | 39 Dynamo |
| 10 Number plate lamp | 40 Switch, oil pressure |
| 11 Tail lamp, LH | 41 Switch, brake fluid reservoir |
| 12 Headlamp, RH, dipped beam | 42 Switch, hand brake |
| 13 Headlamp, LH, dipped beam | 43 Distributor |
| 14 Headlamp, LH, main beam | 44 Switch, cold start in cylinder head |
| 15 Headlamp, RH, main beam | 45 Fuel tank unit |
| 16 Warning light, main beam | 46 Water temperature transmitter |
| 17 Battery, 12 volt | 47 Switch, wiper motor |
| 18 Switch, lights | 48 Stop lamp, RH |
| 19 Switch, ignition and starter | 49 Stop lamp, LH |
| 20 Switch, panel and interior light | 50 Interior lamp |
| 21 Switch, headlamp dip | 51 Flasher lamp, front RH |
| 22 Inspection sockets | 52 Flasher lamp, rear RH |
| 23 Fuse, A1-A2 (35 amp) | 53 Flasher lamp, rear LH |
| 24 Fuse, A3-A4 (35 amp) | 54 Flasher lamp, front LH |
| 25 Flasher unit | |
| 26 Switch and warning light, flasher lamps | |
| 27 Ignition coil | |
| 28 Warning light, choke | |
| 29 Voltage stabiliser, fuel gauge and temperature gauge | |
| 30 Switch, stop lamp | |

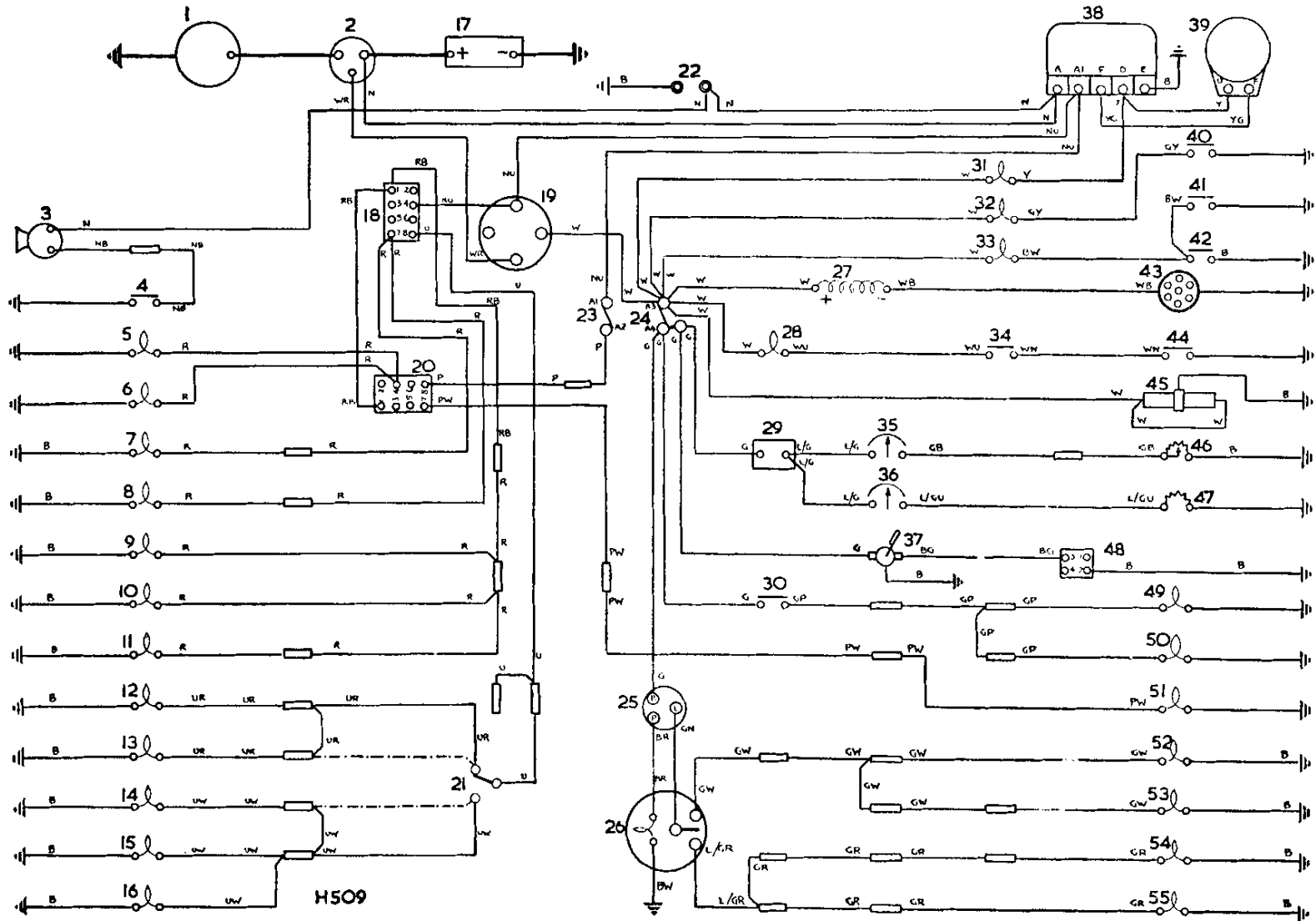
Dotted lined indicate circuit on LHD models

Snap and Lucar connections —  —

Earth connections —  —

Cable colour code

B—Black P—Purple W—White R—Red N—Brown Y—Yellow U—Blue G—Green L—Light



Circuit diagram, 6-cylinder Forward Control Petrol models, negative earth

Key to circuit diagram, 6-cylinder Forward Control Petrol models, negative earth

- | | |
|---|---|
| 1 Starter motor | 31 Warning light, ignition |
| 2 Solenoid, starter motor | 32 Warning light, oil pressure |
| 3 Horn | 33 Warning light, brake fluid reservoir |
| 4 Horn push button | 34 Switch, cold start on control |
| 5 Panel light, speedometer | 35 Fuel gauge |
| 6 Panel light, instruments | 36 Temperature gauge |
| 7 Side lamp, LH | 37 Wiper motor |
| 8 Side lamp, RH | 38 Regulator box |
| 9 Tail lamp, RH | 39 Dynamo |
| 10 Number plate lamp | 40 Switch, oil pressure |
| 11 Tail lamp, LH | 41 Switch, brake fluid reservoir |
| 12 Headlamp, RH, dipped beam | 42 Switch, brake servo |
| 13 Headlamp, LH, dipped beam | 43 Distributor |
| 14 Headlamp, LH, main beam | 44 Switch, cold start in cylinder head |
| 15 Headlamp, RH, main beam | 45 Fuel pump |
| 16 Warning light, main beam | 46 Fuel tank unit |
| 17 Battery, 12 volt | 47 Water temperature transmitter |
| 18 Switch, lights | 48 Switch, wiper motor |
| 19 Switch, ignition and starter | 49 Stop lamp, RH |
| 20 Switch, panel and interior light | 50 Stop lamp, LH |
| 21 Switch, headlamp dip | 51 Interior lamp |
| 22 Inspection sockets | 52 Flasher lamp, front RH |
| 23 Fuse, A1-A2 (35 amp) | 53 Flasher lamp, rear RH |
| 24 Fuse, A2-A4 (35 amp) | 54 Flasher lamp, rear LH |
| 25 Flasher unit | 55 Flasher lamp, front LH |
| 26 Switch and warning light, flasher lamps | |
| 27 Ignition coil | |
| 28 Warning light, choke | |
| 29 Voltage stabiliser, fuel gauge and water temperature gauge | |
| 30 Switch stop lamp | |

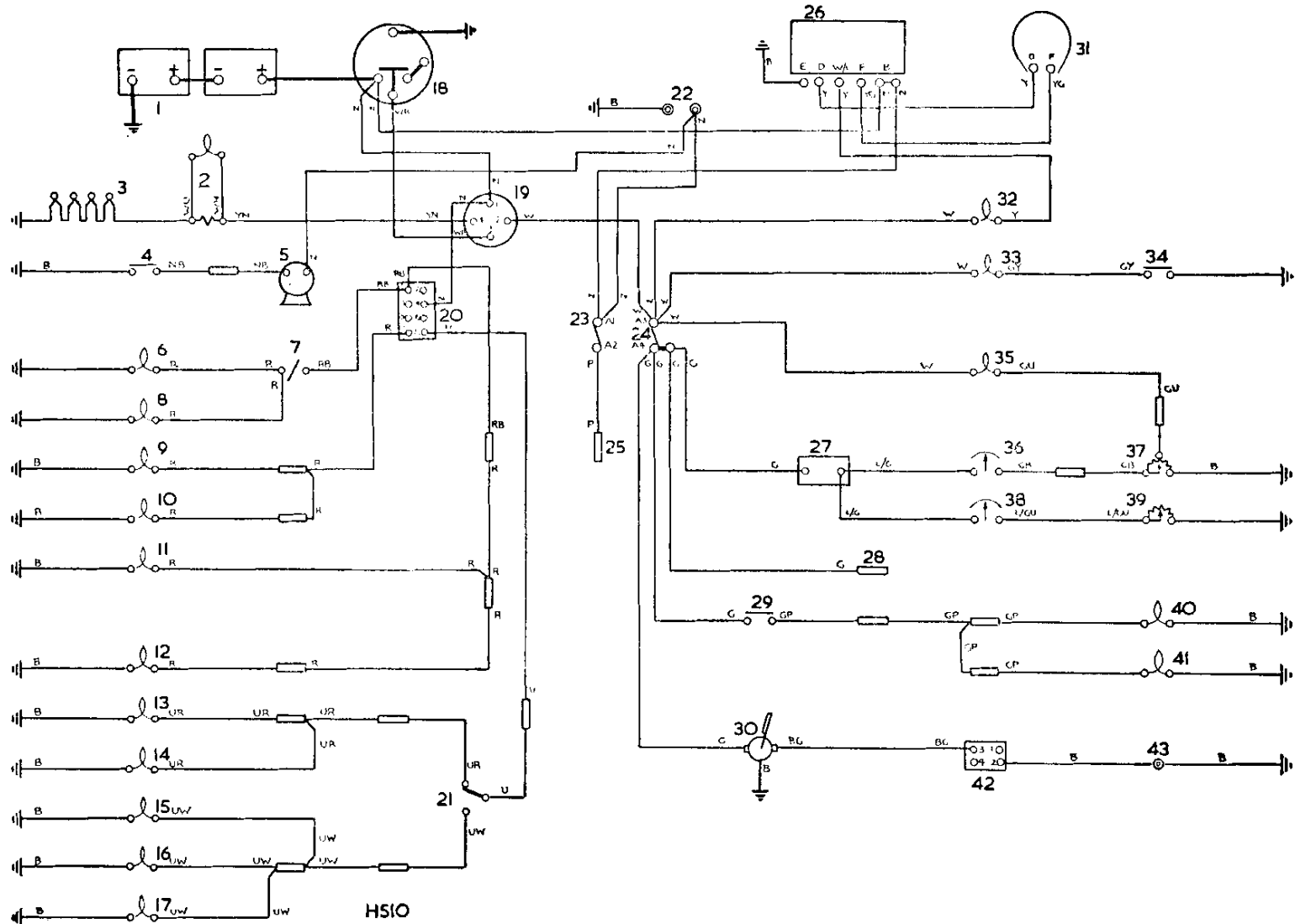
Dotted lines indicate circuit on LHD models

Snap and Lucar connections —□—

Earth connections —|||||—

Cable colour code

- B—Black P—Purple W—White R—Red N—Brown Y—Yellow U—Blue G—Green L—Light



Circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Diesel models, negative earth

Key to circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Diesel models, negative earth

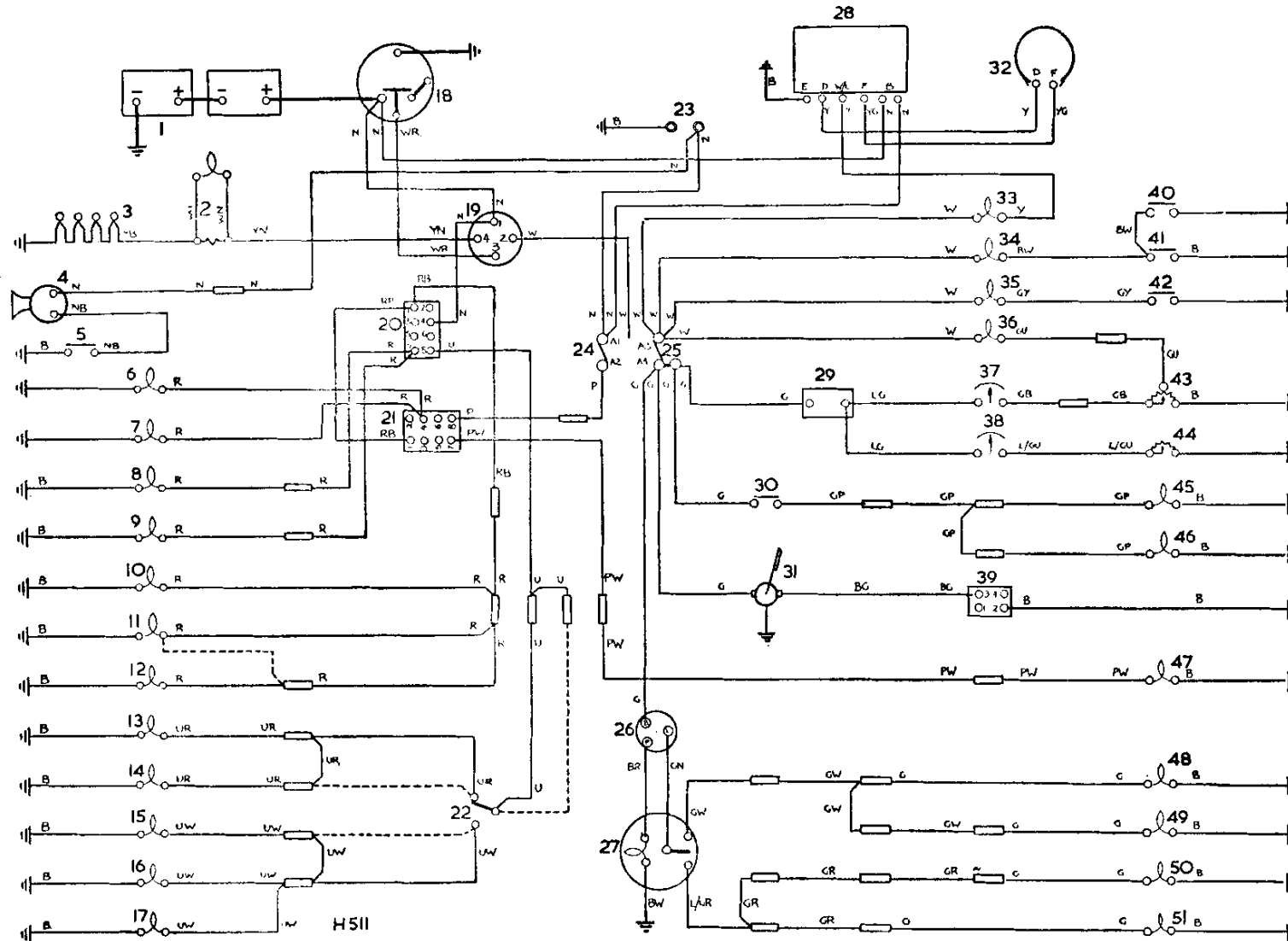
- | | | | |
|----|--|----|--|
| 1 | Batteries, two 6 volt | 25 | Feed, interior light |
| 2 | Warning light and resistor, heater plugs | 26 | Regulator box |
| 3 | Heater plugs | 27 | Voltage stabiliser, fuel gauge and water temperature gauge |
| 4 | Horn push button | 28 | Feed, flasher lights |
| 5 | Horn | 29 | Switch, stop lamp |
| 6 | Panel light, speedometer | 30 | Wiper motor |
| 7 | Switch, panel light | 31 | Dynamo |
| 8 | Panel light, instrument | 32 | Warning light, dynamo |
| 9 | Side lamp, RH | 33 | Warning light, oil pressure |
| 10 | Side lamp, LH | 34 | Switch, oil pressure |
| 11 | Tail lamp, RH | 35 | Warning light, fuel level |
| 12 | Tail lamp, LH | 36 | Fuel gauge |
| 13 | Headlamp, RH, dipped beam | 37 | Fuel tank unit |
| 14 | Headlamp, LH, dipped beam | 38 | Temperature gauge |
| 15 | Headlamp, LH, main beam | 39 | Temperature transmitter unit |
| 16 | Headlamp, RH, main beam | 40 | Stop lamp, RH |
| 17 | Warning light, headlamp main beam | 41 | Stop lamp, LH |
| 18 | Starter motor | 42 | Switch, wiper motor |
| 19 | Switch, starter-heater plugs | 43 | Socket, wiper lead |
| 20 | Switch, lights | | |
| 21 | Switch, headlamp dip | | |
| 22 | Inspection sockets | | |
| 23 | Fuse, A1-A2 (35 amp) | | |
| 24 | Fuse, A3-A4 (35 amp) | | |

Snap and Lucar connections —  —

Earth connections —  —



Cable colour code

- B—Black P—Purple W—White R—Red N—Brown Y—Yellow U—Blue G—Green L—Light



Circuit diagram, 4-cylinder Forward Control Diesel models, negative earth

Key to circuit diagram, 4-cylinder Forward Control Diesel models, negative earth

- | | |
|---|--|
| 1 Batteries two 6 volt | 32 Dynamo |
| 2 Warning light and resistor, heater plugs | 33 Warning light, dynamo |
| 3 Heater plugs | 34 Warning light, brake fluid reservoir |
| 4 Horn | 35 Warning light, oil pressure |
| 5 Horn push button | 36 Warning light, fuel level |
| 6 Panel light, speedometer | 37 Fuel gauge |
| 7 Panel light, instrument | 38 Temperature gauge |
| 8 Side lamp, RH | 39 Switch, wiper motor |
| 9 Side lamp, LH | 40 Switch, brake fluid reservoir |
| 10 Tail lamp, RH | 41 Switch, brake servo |
| 11 Number plate lamp | 42 Switch, oil pressure |
| 12 Tail lamp, LH | 43 Fuel tank unit |
| 13 Headlamp, RH, dipped beam | 44 Temperature transmitter |
| 14 Headlamp LH, dipped beam | 45 Stop lamp, RH |
| 15 Headlamp, LH, main beam | 46 Stop lamp, LH |
| 16 Headlamp, RH, main beam | 47 Interior lamp |
| 17 Warning light, main beam | 48 Flasher lamp, front RH |
| 18 Starter motor | 49 Flasher lamp, rear RH |
| 19 Switch, starter-heater plugs | 50 Flasher lamp, rear LH |
| 20 Switch, lights | 51 Flasher lamp, front LH |
| 21 Switch, panel and interior light | |
| 22 Switch, headlamp dip | Dotted lines indicate circuit on LHD models |
| 23 Inspection sockets | |
| 24 Fuse, A1-A2 (35 amp) | Snap and Lucar connections —  — |
| 25 Fuse, A3-A4 (35 amp) | |
| 26 Flasher unit | Earth connections —  — |
| 27 Switch and warning light, flasher | |
| 28 Regulator box | |
| 29 Voltage stabiliser, fuel gauge and temperature gauge | |
| 30 Switch, stop lamp | |
| 31 Wiper motor | |

Cable colour code

B—Black

P—Purple

W—White

R—Red

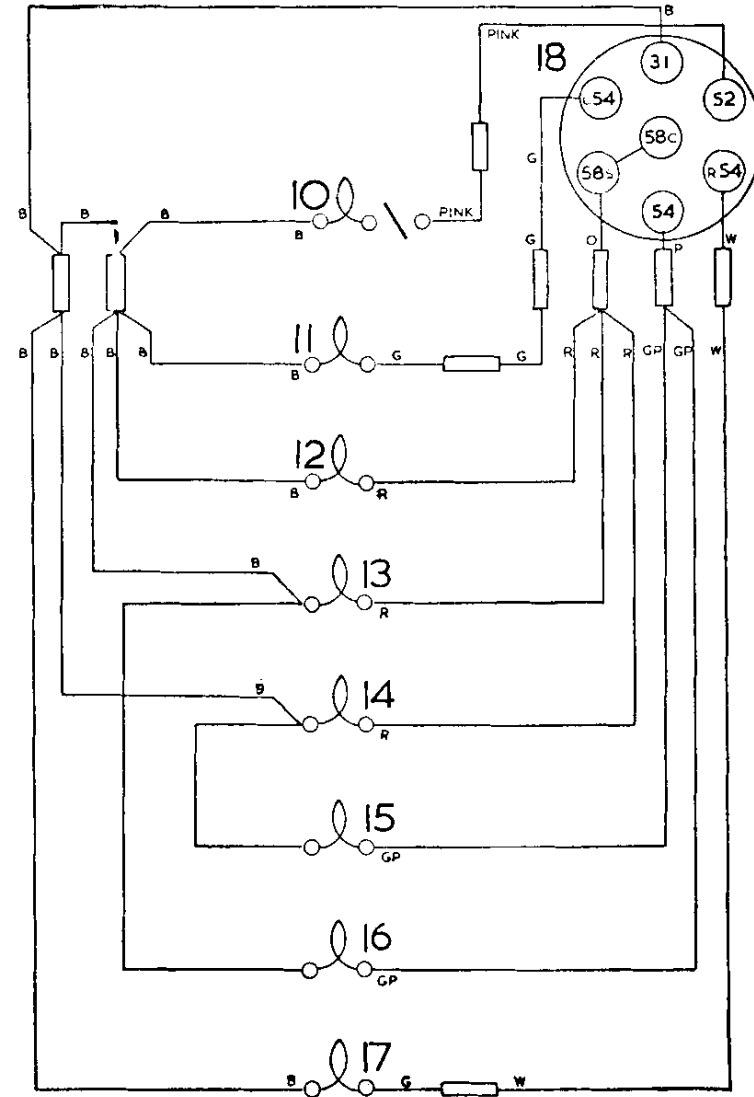
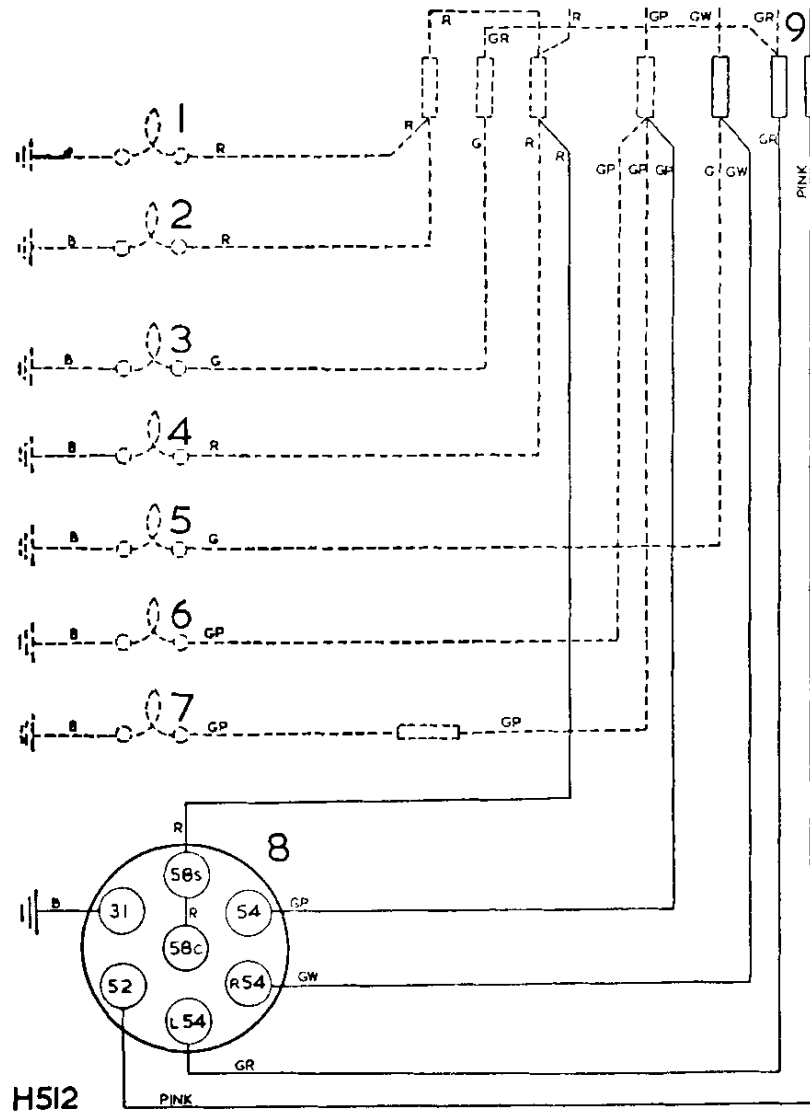
N—Brown

Y—Yellow

U—Blue

G—Green

L—Light



Circuit diagram, flashers on trailer, negative earth

Key to circuit diagram, flashers on trailer, negative earth

- 1 Tail lamp, LH
 - 2 Number plate illumination, Forward Control only
 - 3 Flasher lamp, LH
 - 4 Tail lamp, RH
 - 5 Flasher lamp, RH
 - 6 Stop lamp, RH
 - 7 Stop lamp, LH
 - 8 Socket on vehicle
 - 9 To fuse box A2
 - 10 Interior lamp and switch
- } Flasher socket on vehicle

- 11 Flasher lamp, LH
 - 12 Number plate illumination
 - 13 Tail lamp, LH
 - 14 Tail lamp, RH
 - 15 Stop lamp, RH
 - 16 Stop lamp, LH
 - 17 Flasher lamp, RH
 - 18 Plug for trailer
- } Flasher plug on trailer

Dotted lines indicate wiring on vehicle

Snap and Lucar connections —□—

Earth connections —||||—

Cable colour code

B—Black

P—Purple

W—White

R—Red

N—Brown

U—Blue

G—Green

L—Light

Optional equipment

Some of the optional equipment which may be fitted to the Land-Rover requires maintenance attention at regular intervals, or may need some explanation concerning its use.

These details are given on the pages which follow, under the appropriate headings.

Full details of all the optional equipment available for the Land-Rover are contained in a separate book, from which the following is an extract, and is obtainable free of charge from The Rover Co. Ltd., Technical Service Department, Solihull, Warwickshire, England.

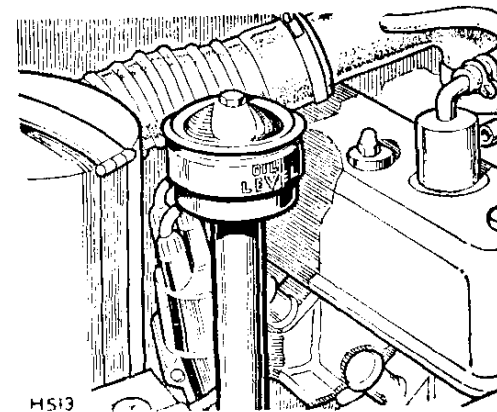
Dust-proofed engine breather, Petrol models

Suitable for 4-cylinder petrol engines only. This breather replaces the normal oil filler cap. It must not be fitted to vehicles operating under cold and misty conditions.

The oil in the engine breather must be renewed weekly. If, however, the vehicle is operating under extremely dusty conditions, this change of oil should be carried out daily.

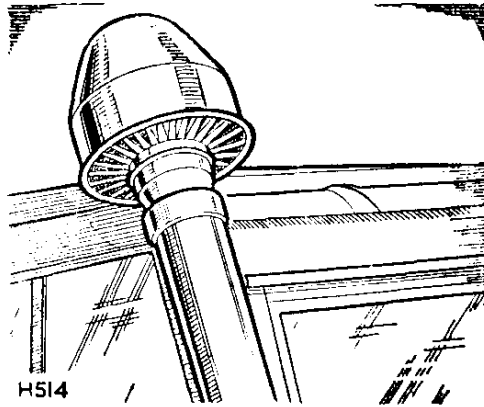
When removing the oil bath breather on the oil filler, care must be taken to hold it upright to avoid spilling the oil.

On vehicles fitted with a raised air intake and a dust-proofed engine breather, the normal air cleaner should be cleaned more frequently.



Dust-proofed engine breather 'Regular' and 'Long' models illustrated

Raised air intake
'Regular' and 'Long'
models illustrated



Raised air intake, Petrol models only

Suitable for 4-cylinder petrol models only, it comprises an air intake for the air cleaner attached to the front RH side of the windscreen, or the rear LH side of the cab on Forward Control models. The engine breather on the top rocker cover is connected to an elbow between carburetter and air cleaner.

This optional equipment must only be used in conjunction with the dust-proofed engine breather described previously.

It must receive occasional attention by removing the centrifugal air intake and blowing out any foreign matter which may be adhering to it.

Power take-off units

Operating instructions for the power take-off units together with pulley, engine and road speeds are contained in a separate book; copies obtainable on request to:

The Rover Company Ltd., Technical Service Dept., Solihull, Warwickshire, England.

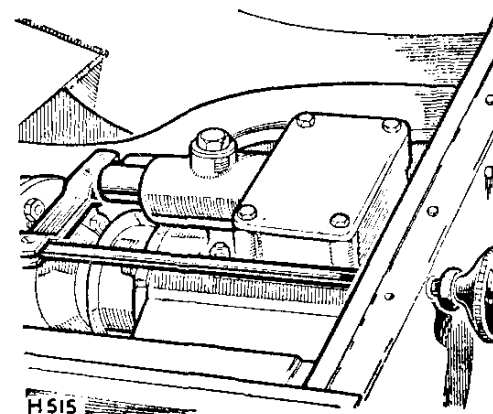
Centre power take-off

The driving pulley, usually of the multi-belt pattern, bolts directly on to the flanged output shaft. Operation and maintenance instructions for the driven equipment will be provided with the equipment and is available from the manufacturer. When the drive is by vee belt, not more than 20–25 BHP can be transmitted through the centre power take-off, or damage to the rear engine mountings will result.

Centre power take-off maintenance

The belt drive to the driven equipment must be adjusted periodically, to ensure that the tension is correct. It should be possible to depress the belts by thumb pressure $\frac{1}{2}$ to 1 in. (12 to 25 mm) at a point midway between the pulleys.

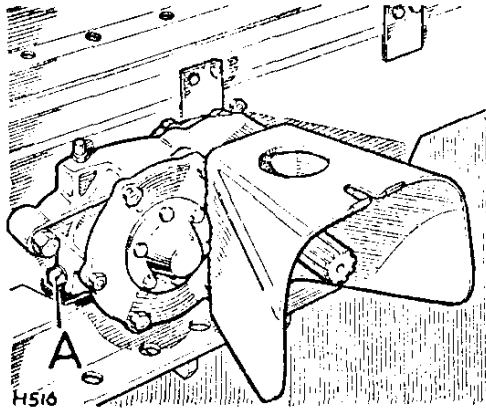
In the case of multi-belt drives, all must be renewed if one belt breaks or is damaged. Whenever the belts are removed they should be marked to ensure replacement in the original grooves.



Centre power take-off
'Regular' and 'Long'
models illustrated

Rear power take-off
'Regular' and 'Long'
models

A—Oil level plug



Rear power take-off, 'Regular' and 'Long' models

The rear power take-off unit, mounted on the rear chassis cross-member, is driven by a propeller shaft from the flanged output shaft at the rear of the gearbox; the standard SAE six-splined output shaft is on the centre-line of the vehicle and provides power for towed equipment.

Rear power take-off maintenance

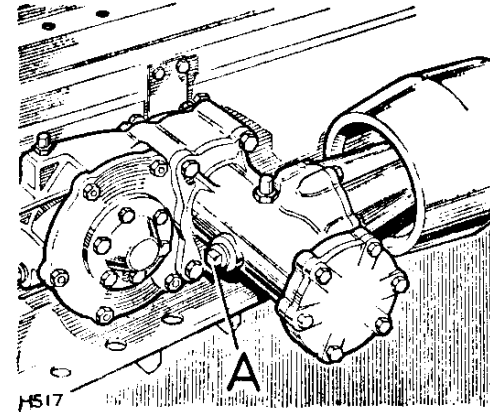
1. Oil level. The oil level must be checked at every 40 operation hours and replenished as necessary to the bottom of the filler/level plug hole on the side of the casing.
2. Oil changes. The oil should be completely drained from the unit after the first 30 hours and thereafter at intervals of six months by removing the drain plug from the bottom of the casing; refill to the bottom of the level plug hole with oil of the recommended grade. The oil capacity is approximately 1 Imperial pint (0,5.litre)
3. Propeller shaft. Lubricate the propeller shaft as applicable with grease of the correct grade at intervals of six months.

Rear drive pulley, 'Regular' and 'Long' models

The 8 in. (200 mm) rear drive pulley unit may be attached to the rear power take-off unit in place of the guard by means of four spring washers and nuts. Difficulty would be experienced in holding the vehicle steady if more than 20 BHP is transmitted through the pulley.

Rear drive pulley maintenance

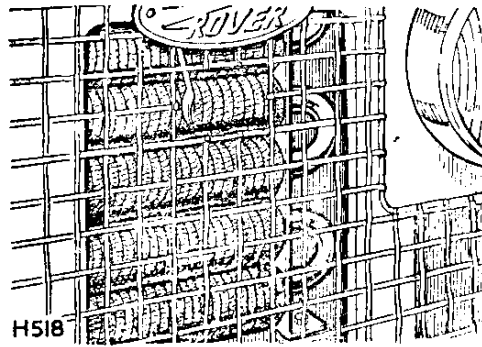
1. Oil level. The oil level must be checked at every 40 operation hours and replenished as necessary to the bottom of the filler-level plug hole in the side of the casing.
2. Oil changes. The oil should be completely drained from the unit after the first 30 hours and thereafter at intervals of six months by removing the unit from the vehicle and pouring out the oil through the filler-level plug hole. Refill to the bottom of the filler-level plug hole with oil of the recommended grade; the capacity is approximately $\frac{3}{4}$ Imperial pint (0,5 litre).



Rear drive pulley
'Regular' and Long
models

A—Oil filler-level plug

Oil cooler
'Regular' and 'Long'
models illustrated



Oil cooler

An engine oil cooler must be fitted when the vehicle is used to drive stationary equipment under conditions in excess of:

Power required: 24 BHP at 2,000 RPM—Petrol models
20 BHP at 1,500 RPM }
24 BHP at 2,000 RPM } Diesel models
20 BHP at 2,500 RPM }
10 BHP at 3,000 RPM }

Ambient air temperatures: 20°C (68°F).

Running time: 30 minutes.

It incorporates a cooling radiator inserted in the engine oil system and mounted just in front of the radiator; a gauge on the dash panel gives continuous indication of the oil temperature.

The oil temperature should never exceed 90°C and the engine must be switched off and the oil allowed to cool down if this temperature is reached under working conditions.

Engine governor, Petrol models only

An engine governor may be fitted when a centre power take-off or rear drive pulley is used; it would also simplify many jobs necessitating use of the rear splined output shaft.

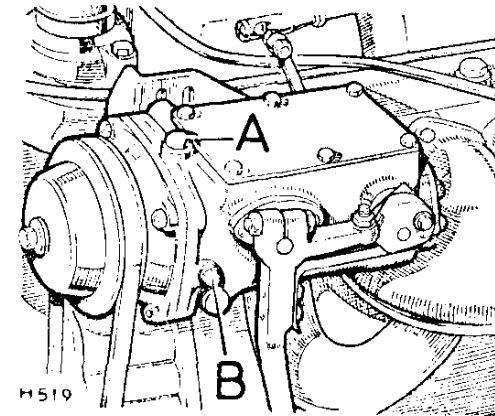
Engine governor maintenance

Every 40 operation hours, check the oil level in the governor body by removing the filler plug at the top front and the level plug at the left-hand side; replenish as necessary with engine oil through the filler hole, until the level is to the bottom of the level plug hole. Replace both plugs.

Hydraulic winch

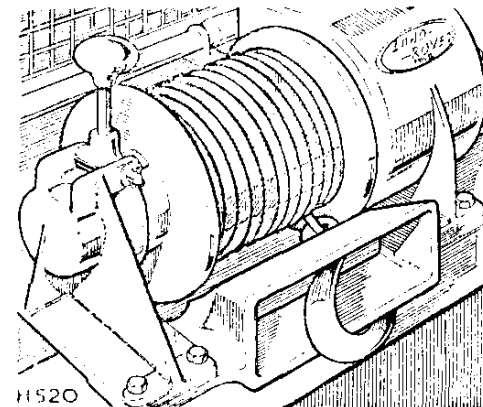
This comprises a hydraulic drum winch, with cable, which is mounted at the front of the vehicle on 'Regular' and 'Long' models, or in a central chassis position, beneath the body, on Forward Control models.

It is driven by a hydraulic pump fitted to the rear of the transfer gearbox.



**Engine governor,
Petrol models**

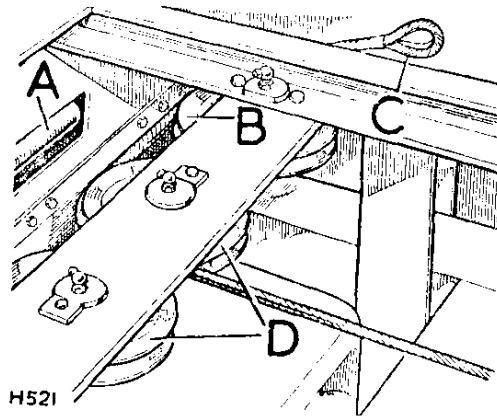
A—Oil level plug
B—Oil drain plug



**Hydraulic winch
'Regular' and 'Long'
installation**

Cable guide wheels, Forward Control models

- A—Guide wheels, rope
to rear
- B—Guide wheel, rope
to front
- C—Cable end
- D—Rear rollers



Operating controls are fitted to the heel board, inside the cab, and a hydraulic oil supply tank is fitted in the rear LH side wheelarch on 'Regular' and 'Long' models, or at the rear RH side of the vehicle on Forward Control models.

The following details are applicable to the Forward Control installation only.

A spring-loaded roller is fitted to the drum; this retains the rope if the pull falls off.

A guide ensures even rope lay on the drum when the pull is in the region of 400 lbs (182 kg).

The rope hook is removable in order that the rope may be threaded to the front or rear of the vehicle.

When winching from the rear the rope is fed from the drum, through the guide bracket, between two of the guide wheels and through the rear rollers.

To winch from the front of the vehicle; remove the hook, pass the rope back through the rear rollers and around the third guide wheel, through the pigtail guide brackets on the LH side chassis member, to the front roller box on front bumper bar. Remove one of the retaining bolts and a roller, and slacken the nut on the other retaining bolt.

Pass the rope through the box, then replace the roller, bolt, spring washer and nut. Retighten both nuts and refit the rope hook.

Instructions for using hydraulic winch, all models

1. Vehicle should be positioned in line with the object to be recovered, or in the case of self-recovery the end of the cable should be anchored in line with the vehicle.
2. The transfer box lever should be placed in the neutral position.
3. Engage 3rd gear in the main gearbox and pull out the power take-off lever protruding through the heel board. The hydraulic pump will then be driving when the clutch is released.

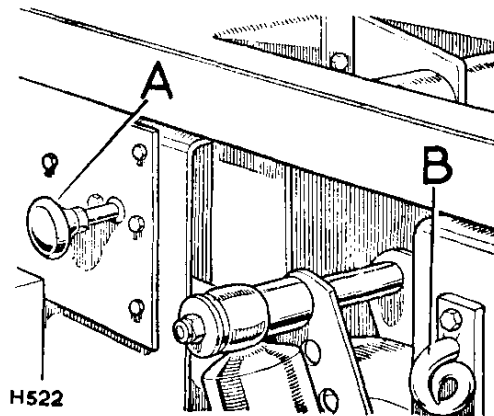
The engine should be run at approximately 2,000 rpm, which will result in the pump being driven around 1,500 rpm. In practice the engine can be controlled during self-recovery by the accelerator pedal, but for some applications the hand throttle can be used.

4. The hydraulic control lever protruding from the heel board can now be moved to the desired 'Pay-out' or 'Pay-in' position. Upon releasing this control it will automatically return to the central (neutral) position.

To 'Pay-out' the cable, push the control lever downwards, or on the Forward Control installation push the control inwards. Reverse the movements to 'Pay-in' the cable.

Engagement control,
drum to shaft, For-
ward Control models

A—Control knob
B—Cable guide
bracket



The following points should be noted:

1. The control for the engagement of the cable drum to the driving shaft, on the front installation is on the RH side of the winch unit, and on Forward Control models is midway down the LH side chassis member. Pull this control outwards to engage.

When disengaged for a rapid run-out of the cable, two inbuilt brake pads prevent over-run of the drum, which would otherwise cause the cable to spring into loose coils.

2. When rewinding the slack cable after a winching operation, it is necessary to apply some resistance to the cable to obtain a neat and even lay on the drum.

With the front-mounted installation, an assistant holding the end of the cable against the pull of the drum will be found sufficient.

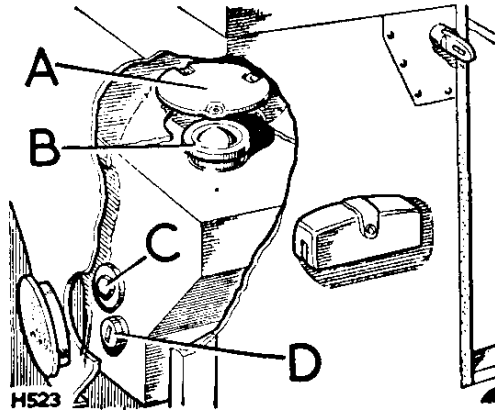
The Forward Control installation will require resistance in the region of 400 lbs (182 kg).

This may be obtained by such means as winching in another vehicle on which the brakes are lightly applied, or alternatively by anchoring the cable to a tree or ground anchor and allowing the winch to pull the vehicle along, while the brakes are held lightly applied.

3. If the overload safety valve operates during a winching operation (indicating that the maximum pull has been exceeded) the control valve can be moved to the 'Pay-out' position and then re-engaged to 'Pay-in' position.
4. When recovery or self-recovery operations take place on a very steep slope, the maximum pull sometimes is exceeded due to the angle of the cable when the vehicle has reached the apex of the hill. If the safety valve operates it will sometimes be found that a restart is not possible. In these circumstances the vehicle should be lowered a certain amount in the 'Pay-out' position, and a further attempt made after the tension in the cable has been reduced.
5. Ground anchors, sprags under the wheels, other vehicles, trees, etc., can be used for securing the vehicle when it is used for general winching or for securing the end of the cable when self-recovery is necessary. The safety valve in the pressure line of the hydraulic system will prevent damage to both the winch and the vehicle.
6. The power take-off lever should be returned to the disengaged position after winching operations are completed, to prevent the pump being driven unnecessarily when travelling along the road.

Supply tank for hydraulic winch, 'Regular' and 'Long' models illustrated

- A—Cover plate
- B—Filler cap
- C—Oil filter
- D—Drain plug



Hydraulic winch maintenance

1. Every 40 operation hours check the oil level in the hydraulic oil supply tank. Oil should be just visible in the bottom of the oil filter.
2. Oil level in winch gearbox. Every 40 operation hours check the oil level by removing the level plug in the side of the end casing. Replenish as necessary, to the bottom of the level plug hole.
3. Oil changes. Every six months, drain off the oil from the supply tank by removing the slotted head drain plug. At the same time remove and clean the tank oil filter.

Also drain off the oil from the winch gearbox by removing the side cover plate.

Refill both supply tank and winch gear with oil of the correct grade.

Capacity:

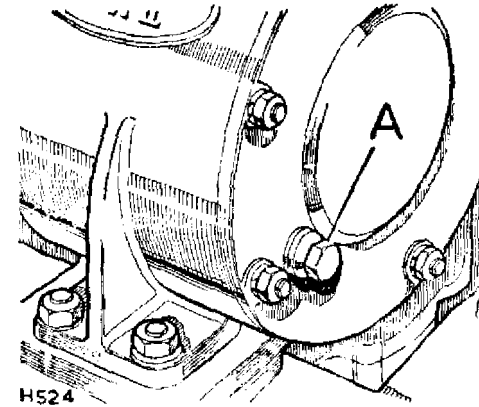
Supply tank: 4½ gallons (7½ US gallons, 20,0 litres)

Winch gearbox: 2 pints (2½ US pints, 1,0 litre)

- 4. Lubrication nipples. Every 40 operation hours apply one of the recommended grades of grease to the lubrication nipples.

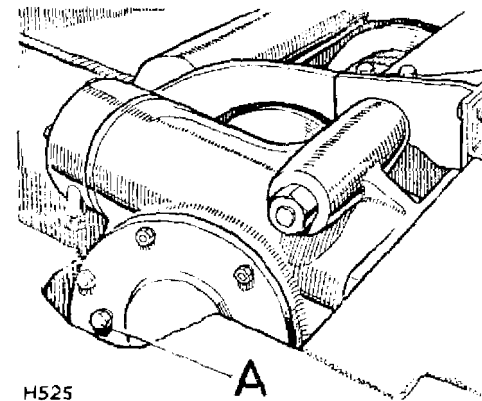
At the same time, lubricate with oil, the drum shaft and control lever and, on Forward Control models, the control rod relays (2).

The drum lubrication nipples are accessible after paying out the winch cable.



Hydraulic winch gear-box, 'Regular' and 'Long' models

A—Filler-level plug



Hydraulic winch gear-box, Forward Control models

A—Filler-level plug

FAULT FINDING

Location and remedy of faults

The following pages set out the recommended procedure for a systematic examination to locate and remedy the causes of some of the faults which may occur during the life of the vehicle.

All the checks listed can be readily carried out without special equipment; if the fault is not located in this way, consult the local Rover distributor or dealer, who will be able to investigate the defect more closely.

Engine fails to start, Petrol models

1. Check that the ignition is switched on.
2. Check that there is sufficient petrol in the tank.
3. Check that the cold start control is set correctly.
4. Check that the engine is being turned at an adequate speed by the starter motor; this speed will be recognised after some experience with the vehicle.

If the cranking speed is too low:

- (i) Check the battery connections for tightness and cleanliness.
- (ii) Check the state of charge of the battery by switching on the headlamps and pressing the starter button; if the headlamps go out or very dim when the starter is operated, the battery requires recharging from an independent electrical supply.

It should be possible to start the engine by cranking with the starting handle.

A warning is given against the possibility of electric shock when handling the HT equipment. This danger will be eliminated by giving careful thought to the action anticipated, before carrying it out.

5. Remove and clean the sparking plugs and reset the electrode gaps to .029 to .032 in. (0,75 to 0,80 mm). Refit to engine; as plug covers are fitted an audible check should now be made.
 - (i) Lift the cover from each plug terminal in turn, about $\frac{1}{4}$ in. (7 mm) and listen for the sharp snap of the spark, as the engine is turned over. Sparking should be strong and regular.
 - (ii) If the sparks are not regular:
 - (a) Check that the distributor rotor is in position.
 - (b) Check that the LT connections on the coil and distributor are clean and tight.
 - (c) Check that the distributor points are:
 1. Clean and opening and closing correctly.
 2. Correctly set when open, gap .014 to .016 in. (0,35 to 0,40 mm).
 - (d) Check that current is present at the SW terminal on the coil, by disconnecting the wire at the coil end and touching it against the SW terminal, with the ignition switch on and the distributor contact-breaker points closed. If sparks occur, low tension current is flowing through the coil correctly; if there is no spark, either the coil or the low tension wiring is defective and your dealer should be consulted.
 - (iii) If the sparks are weak and in addition there is a flashing at the distributor contact-breaker points, a faulty distributor condenser is indicated.
 - (iv) If the sparks are present on some leads, but not on others, check the distributor cap for cracks and the plug leads for faulty insulation.

6. Disconnect the petrol pipe from the carburetter and check that petrol is delivered to the carburetter when the hand lever on the petrol pump is operated. If petrol is not delivered from the pipe:
 - (i) Check that the petrol pipes and filters are clear.
 - (ii) Check that there are no air leaks in the suction line to the petrol pump.

Engine starts but soon stops, Petrol models

1. Check that the controls are set correctly.
2. Check the petrol feed to the carburetter.
If there is little or no flow:
 - (i) Check the petrol level in the tank.
 - (ii) Check that the air vent in the filler neck is clear.
 - (iii) Check the petrol pump for correct operation.
 - (iv) Check that the petrol filters are clear.
 - (v) Check that the petrol pipes are clear.

Engine misfires, Petrol models

Engine not running on all cylinders, either intermittently or continually.

1. Stop the engine and endeavour to re-start with the starter motor to check the state of the battery and connections. If the battery is in a low state of charge, it will need recharging from an independent electrical supply, and the charging circuit should be checked as directed under charging circuit below.

Before making the tests on the HT equipment you are advised to read the warning on page 92.

2. Remove the cover from each sparking plug in turn and check:

- (i) By raising the cover from the plug terminal about $\frac{1}{4}$ in. (7 mm) whilst engine is running. Sparks should be heard jumping the gap regularly.

If no spark is present on one or more cylinders:

- (a) Remove and check the sparking plug concerned.
- (b) Check for moisture on the HT leads or distributor.
- (c) Check, clean and reset the distributor contact-breaker points to .014 to .016 in. (0,35 to 0,40 mm) as necessary
- (d) Check the distributor cap for cracks and the plug leads for faulty insulation.

If the spark is irregular on all cylinders:

- (a) Check for moisture on HT leads or distributor.
- (b) Check the distributor points, clean and re-set as necessary.
- (c) Check the distributor cap for cracks and plug leads for faulty insulation.
- (d) Check the LT connections for tightness and cleanliness.
- (e) Check for flashing or 'blueing' of the contact-breaker points. If present, the distributor condenser should be renewed.
- (f) Check for a fault in the ignition circuit by connecting a wire between the 'A' connection on the voltage regulator box and the 'SW' connection on the coil, thus by-passing the ignition switch. At the same time, the wire from the ignition switch must be disconnected from the coil. Leave the ignition switch off.

Note: When making the above test remember that the 'A' terminal is at battery potential. Connections to it must not be allowed to make contact with the metalwork of the vehicle otherwise a short circuit of the battery will result.

- (ii) Listen for any audible alteration in the running of the engine, as each cover is lifted. No alteration will indicate that the sparking plug in question is at fault:
 - (a) Remove and replace or clean the plug; reset the gap to .029 to .032 in. (0,75 to 0,80 mm) as necessary.
3. If the 'missing' is accompanied by 'spitting back' through the carburetter, a valve may be sticking. This can often be cured by slowly dropping thin oil or upper cylinder lubricant into the carburetter intake, while the engine is running. Persistence of this complaint points to the need for an engine overhaul.

Lack of engine power, Petrol models

1. Check that the carburetter throttle is opening fully.
2. Check that the brakes are not binding and that the tyre pressures are correct.
3. Check the ignition timing.
4. Check the tappet adjustment.
5. If items 1-4 are satisfactory, it is probable that the engine needs decarbonising, and your Rover distributor or dealer should be consulted.

Starter motor, Petrol models

1. Starter motor lacks power or fails to turn engine.
 - (a) Gearbox or power take-off auxiliary engaged.
 - (b) See if the engine can be turned over by hand. If not, the cause of the stiffness of the engine must be located and remedied.

- (c) If the engine can be turned by hand, check that the trouble is not due to a discharged battery
 - (d) Examine the connections to battery, starter and starter switch, making sure that they are tight and that the cables connecting these units are not damaged.
 - (e) It is also possible that the starter pinion may have jammed in mesh with the flywheel, although this is by no means a common occurrence. To disengage the pinion, pull off the dust cap and rotate the squared end of the starter shaft by means of a spanner.
2. Starter operates, but does not crank engine.
This fault will occur if the pinion of the starter drive is not allowed to move along the screwed sleeve into engagement with the flywheel, due to dirt having collected on the screwed sleeve. Clean the sleeve carefully with paraffin.
 3. Starter pinion will not disengage from flywheel when engine is running.
Stop the engine and ascertain if the starter pinion is jammed in mesh with the flywheel. Release it, if necessary, by withdrawing the dust cap and rotating the squared end of the starter shaft in the opposite direction to normal rotation. If the pinion persists in sticking in mesh, have the equipment examined at a service depot. Serious damage may result to the starter if it is driven by the flywheel.

Engine will not crank by starter, Diesel models

1. Gearbox or power take-off auxiliary engaged.
2. Battery terminals loose or broken or batteries discharged.
3. Switch wires and connections loose or broken or switch fault.
4. Starter or solenoid faulty.
5. Short circuit on heater plugs.

Engine will not crank, starter motor rotates, Diesel models

1. Faulty starter clutch assembly.

Engine will not crank on handle, Diesel models

1. Gearbox or power take-off auxiliary engaged.
2. Starter bendix jammed.
3. Hydraulic lock. Water in combustion chamber. Check for internal water leaks.
4. Hydraulic lock. Oil in combustion chamber.
5. Pump faulty. Must be repaired by a CAV Agent.

Engine cranking speed low, Diesel models

1. Battery terminals loose or broken or batteries discharged.
2. Earth connection, chassis to engine, broken or loose.
3. Wrong grade engine oil.
4. Starter faulty or short circuit on heater plugs.

Sufficient engine cranking speed, engine will not start, Diesel models

1. Little or no fuel in tank. Replenish and prime system.
2. Stop control out or shut-off lever jammed. Linkage incorrectly adjusted.
3. Incorrect starting procedure.

4. Heater plugs faulty.
5. Throttle sticking or incorrectly adjusted.
6. Air in system due to fuel leaks on fuel pump, filter, injection pump or connection pipes. Rectify as necessary and prime system.
7. Insufficient flow of fuel at injection pump inlet.
8. Ample fuel at pump inlet but little or no fuel at injector pipes. Check that nylon or gauze filter at distributor pump inlet connection is not blocked or choked. If in doubt about pressure of fuel to injectors, remove injector and allow to spray in air. Keep well away from spray as fuel will penetrate the skin easily under these conditions. Ensure stop lever is in 'run' position. If no injection, remove pump for checking, rectification or replacement.
9. Water in fuel system. Drain fuel system completely. Fit new paper filter element. It is advisable to remove injector pump for checking by a CAV Agent. After refitting pump, refill tank with clean fuel, prime fuel system.
10. Air vent at fuel tank restricted, causing vacuum.
11. Tank pick-up pipe blocked or fractured.
12. Incorrect pump timing or valve timing.
13. Very low compression pressure due to faulty cylinder head gasket, piston rings or valves, etc.
14. Injectors or pump faulty. Pump must be repaired by a CAV Agent.
15. Aid to diagnosis of trouble, observe whether white smoke is emitted from exhaust. If no white smoke, fault is with injection equipment. If white smoke, fault is unlikely to be in injection equipment.

Engine difficult to start, cranking speed sufficient, Diesel models

1. Stop control out or shut-off lever jammed. Linkage incorrectly adjusted.
2. Incorrect starting procedure.
3. Heater plugs faulty.
4. Throttle sticking or incorrectly adjusted.
5. Faulty injectors.
6. Incorrect pump timing.
7. Leaking injector pipes.
8. Low compression pressures.
9. Pump faulty. Must be repaired by a CAV Agent.

Engine starts but stops after a little running, requires priming to restart, Diesel models

1. Little or no fuel in tank. Replenish and prime system.
2. Air in system due to fuel leaks on fuel pump, filter, injection pump or connection pipes. Rectify as necessary and prime system.
3. Insufficient flow of fuel at injection pump inlet.
4. Ample fuel at pump inlet but little or no fuel at injector pipes. Check that nylon or gauze filter at distributor pump inlet connection is not blocked or choked. If in doubt about pressure of fuel to injectors, remove injector and allow to spray in air. Keep well away from spray as fuel will penetrate the skin easily under these conditions. Ensure stop lever is in 'run' position. If no injection, remove pump for checking, rectification or replacement.

5. Air vent at fuel tank restricted, causing vacuum.
6. Tank pick-up pipe blocked or fractured.
7. Water in fuel. Drain and clean complete fuel system. Renew paper filter element. Drain and clean fuel storage tank. It is advisable to remove distributor pump for checking by a CAV Agent. After refitting pump, refill tank with clean fuel and prime fuel system. Ensure that dust and water is excluded to avoid recurrence of trouble.

Engine stalls, Diesel models

1. Engine operating temperature too low.
2. Idling stop incorrectly set. Reset to 590 ± 20 rpm with hand brake on, while engine is hot. Must be carried out by Rover Distributor or Dealer.
3. Faulty injectors, incorrect pump timing, leaking injector pipes, faulty pump.
4. Excessive load, e.g., power take-off.
5. Internal collapse of air cleaner connection.

Engine will not idle, Diesel models

1. Hand or foot throttle linkage incorrectly set or jamming. Check with hand brake on and off and adjust as necessary.
2. Idling stop incorrectly set.
3. Injectors or pump faulty. Pump must be repaired by a CAV Agent.

Engine misfires, Diesel models

1. Engine running on less than four cylinders, either intermittently or continually. Check injectors, rectify or replace. Check for leaks on high pressure pipes.
2. Check for blockage in spill pipe and connections.

Lack of power, Diesel models

1. Throttle linkage incorrectly set or jamming.
2. Excessive load on vehicle or power take-off; e.g., brakes binding.
3. Faulty injectors or low compression pressures.
4. Maximum speed stop incorrectly set. Reset to $4,000 \pm 20$ rpm with engine hot. Must be carried out by a Rover Distributor or Dealer.
5. Pump faulty. Must be repaired by a CAV Agent.
6. Tappets incorrectly set. Reset inlet and exhaust tappets to .010 in. (0,25 mm) with engine hot or cold.
7. Petrol in fuel.

Smoke, Diesel models

1. Faulty injectors or incorrect pump timing.
2. Overfilled oil bath in air cleaner. Fill to correct level.
3. Choked air cleaner. Clean as maker's instructions.
4. Worn or faulty engine condition.
5. Pump faulty. Must be repaired by a CAV Agent.

Charging circuit, all models

1. Battery in low state of charge.

- (a) This state will be shown by lack of power when starting, poor light from the lamps and hydrometer readings below 1.200, and may be due to the dynamo either not charging or giving low or intermittent output. Check the ammeter reading when the vehicle is running steadily in top gear with no lights in use; a definite steady charge should be indicated. The charging warning light will not go out if the dynamo fails to charge, or will flicker on and off in the event of intermittent output.
- (b) Examine the charging and field circuit wiring, tightening any loose connections, or replacing broken cables. Pay particular attention to the battery connections.
- (c) Examine the fan and dynamo driving belt; adjust tension as necessary.
- (d) If the cause of the trouble is not apparent, have the equipment examined at a service depot.

2. Battery overcharged.

This will be indicated by burnt-out bulbs, very frequent need for topping-up of battery and high hydrometer readings. Check the ammeter reading when the car is running steadily—with a fully charged battery and no lights or accessories in use, the charge reading should be of the order of only 3-4 amperes. If the ammeter reading is in excess of this value, it is advisable to have the regulator setting tested and adjusted if necessary at a service depot.

Lighting circuits

1. Lamps give insufficient illumination.

- (a) Test the state of charge of the battery, recharging it if necessary either by a long period of day-time running or from an independent electrical supply.
- (b) Check the setting of the headlamps.
- (c) If the bulbs are discoloured as a result of long service, they should be renewed.

2. Lamps light when switched on, but gradually fade out.
Test the state of charge of the battery, recharging it if necessary either by a long period of day-time running or from an independent electrical supply.
3. Brilliance varies with speed of vehicle.
 - (a) Test the state of charge of the battery, recharging it if necessary either by a long period of day-time running or from an independent electrical supply.
 - (b) Examine the battery connections, making sure that they are tight; replace faulty cables.
4. Lights flicker.
Examine the circuits of the lamps for loose connections.
5. Failure of lights.
 - (a) Test the state of charge of the battery, recharging it if necessary either by a long period of day-time running or from an independent electrical supply.
 - (b) Examine the wiring for a loose or broken connection and remedy.

PART THREE
GENERAL DATA

Engine, 4-cylinder Petrol models

Bore	....	....	....	....	....	....	....	....	3.562 in. (90,49 mm)
Stroke	....	....	....	....	....	....	....	....	3.500 in. (88,9 mm)
Number of cylinders	....	....	....	....	....	....	....	....	4
Cylinder capacity	....	....	....	....	....	....	....	....	139.5 cu. in. (2,286 cc)
Compression ratio	....	....	....	....	....	....	....	....	7.0:1
BHP	....	....	....	....	....	....	....	....	77 at 4,250 rpm
Maximum torque	....	....	....	....	....	....	....	....	124 lb ft (17 mkg) at 2,500 rpm
Firing order	....	....	....	....	....	....	....	....	1, 3, 4, 2
Sparking plug type	....	....	....	....	....	....	....	....	Champion N8
Sparking plug point gap	....	....	....	....	....	....	....	....	.029 to .032 in. (0,75 to 0,80 mm)
Distributor contact breaker gap	....	....	....	....	....	....	....	....	.014 to .016 in. (0,35 to 0,40 mm)
Ignition timing (static—full retard)	....	....	....	....	....	....	....	....	3° BTDC 83 octane fuel
Ignition timing to be set to	....	....	....	....	....	....	....	....	6° BTDC 90 octane fuel
Tappet clearance, inlet	....	....	....	....	....	....	....	....	.010 in. (0,25 mm)
Tappet clearance, exhaust	....	....	....	....	....	....	....	....	.010 in. (0,25 mm)
Valve timing (No. 1 exhaust valve peak)	....	....	....	....	....	....	....	....	95° BTDC

} United Kingdom
} use two-star grade fuel
} Engine at
} running temperature

Oil pressure	....	....	..	....	....	....	55 to 65 lb/sq in. (3,8 to 4,6 kg/cm ²) at 30 mph (50 kph) in top gear with engine warm
Lubrication	....	....	....	....	....	....	Full pressure
Oil filter, internal	....	....	....	....	....	....	Gauze pump intake filter in sump
Oil filter, external	....	....	....	....	....	....	Full-flow filter

Engine, 6-cylinder Petrol models

Bore	....	....	....	....	....	....	3.063 in. (77,8 mm)
Stroke	....	....	....	....	....	....	3.625 in. (92,075 mm)
Number of cylinders	....	....	....	....	....	....	6
Cylinder capacity	....	....	....	....	....	....	160.3 cu. in. (2,625 cc)
Compression ratio							
Forward Control	....	....	....	....	....	....	7.0:1
'Long' models	....	....	....	....	....	....	7.8:1
'Long' models	....	....	....	....	....	....	7.0:1 Certain Export territories
BHP							
Forward Control 7.0:1 compression ratio							88 at 4,500 rpm
'Long' models 7.8:1 compression ratio							93 at 4,500 rpm
'Long' models 7.0:1 compression ratio							88 at 4,500 rpm
Maximum torque							
Forward Control 7.0:1 compression ratio							130 lb ft (17,9 mkg) at 1,500 rpm

'Long' models 7.8:1 compression ratio	135 lb ft (18,6 mkg) at 1,750 rpm
'Long' models 7.0:1 compression ratio	130 lb ft (17,9 mkg) at 1,750 rpm
Firing order	1, 5, 3, 6, 2, 4
Sparking plugs	
7.8:1 and 7.0:1 compression ratio	Champion N5
Sparking plug point gap	.029 to .032 in. (0,75 to 0,80 mm)
Distributor contact breaker gap	.014 to .016 in. (0,35 to 0,40 mm)
Ignition timing (static—full retard)	
7.8:1 compression ratio	2° ATDC 90 octane fuel
7.0:1 compression ratio	2° BTDC 83 octane fuel
	} United Kingdom use } 2 Star grade fuel
Tappet clearance, inlet	.006 in. (0,15 mm)
Tappet clearance, exhaust	.010 in. (0,25 mm)
	} Engine at } running temperature
Valve timing (No. 1 exhaust valve peak)	
7.8:1 compression ratio	106° BTDC
7.0:1 compression ratio	106° BTDC
Oil pressure	40 to 55 lb/sq in. (2,8 to 4,0 kg/cm ²) at 30 mph (50 kph) in top gear with engine warm
Lubrication	Full pressure
Oil filter, internal	Gauze pump intake filter in sump
Oil filter, external	Full-flow filter

Engine, Diesel models

Bore	....	....	....	....	....	....	....	....	3.562 in. (90,49 mm)
Stroke	....	....	....	....	....	....	....	....	3.500 in. (88,9 mm)
Number of cylinders	....	....	....	....	....	....	....	....	4
Compression ratio	....	....	....	....	....	....	....	....	23:1
Cylinder capacity	....	....	....	....	....	....	....	....	139.5 cu. in. (2,286 cc)
BHP	....	....	....	....	....	....	....	....	67 at 4,000 rpm
Torque	....	....	....	....	....	....	....	....	105 lb ft (14,5 mkg) at 1,800 rpm
Firing order	....	....	....	....	....	....	....	....	1, 3, 4, 2
Tappet clearance, inlet	....	....	....	....	....	....	....	....	.010 in. (0,25 mm) } Engine cold or at running temperature
Tappet clearance, exhaust	....	....	....	....	....	....	....	....
Valve timing (No. 1 exhaust valve peak)	....	....	....	....	....	....	....	....	109° BTDC
Oil pressure	....	....	....	....	....	....	....	....	50 to 60 lb/sq in. (3,5 to 4,2 kg/cm ²) at 30 mph (50 kph) in top gear with engine warm
Lubrication	....	....	....	....	....	....	....	....	Full pressure
Oil filter, internal	....	....	....	....	....	....	....	....	Gauze pump intake filter in sump
Oil filter, external	....	....	....	....	....	....	....	....	Full-flow filter

Clutch, 4-cylinder models

Type	....	....	....	....	....	....	....	....	Single dry plate 9 in. (230 mm) diameter. Hydraulic operation
Adjustment	....	....	....	....	....	....	....	....	Hydrostatic clutch. No adjustment necessary

Overall ratio (final drive)	In high transfer	In low transfer
Top	7.19:1	15.4:1
Third	10.80:1	23.1:1
Second	15.96:1	34.1:1
First	25.9:1	55.3:1
Reverse	21.7:1	46.4:1

Fuel system, 4-cylinder Petrol models

Petrol pump	Mechanical, with sediment bowl
Carburettor	Zenith 36 I.V.
Air cleaner	Oil bath type with integral centrifugal pre-cleaner

Fuel system, 6-cylinder Petrol models

Petrol pump	Dual electric, located at chassis side-member
Carburettor, all Forward Control and early 6-cylinder 'Long' models	SU HD 6 single horizontal, dust-proof
Carburettor, late 6-cylinder 'Long' models	Zenith Type 175 CD 2S single horizontal, dust-proof
Air cleaner, all models	Oil bath type with integral centrifugal pre-cleaner

Fuel system, Diesel models

Fuel pump	Mechanical with hand primer (high pressure type)
Air cleaner	Oil bath type with integral centrifugal pre-cleaner
Fuel filters	
'Regular', 'Long' and Station Wagon	Sediment bowl and paper element filter
Forward Control	Paper type element and sedimentor

Suspension

Road springs	....	....	....	....	....	....	....	Semi-elliptic leaf
Hydraulic dampers	....	....	....	....	....	....	....	Telescopic; non-adjustable

Brakes

Foot brake 88	....	....	....	....	....	....	....	Hydraulic, 10 in. brake drums
Foot brake 109	....	....	....	....	....	....	....	Hydraulic, 11 in. brake drums. Servo assisted on Forward Control and 6-cylinder 'Long' models
Hand brake	....	....	....	....	....	....	....	Mechanical on transfer box output shaft

Steering

Type	....	....	....	....	....	....	....	Recirculating ball 'Regular', 'Long' and Station Wagon models	Forward Control models
Ratio: Straight ahead	....	....	....	....	....	....	....	15.6:1	19.6:1
Full lock	....	....	....	....	....	....	....	23.8:1	29.9:1
Front wheel toe-in	....	....	....	....	....	....	....	$\frac{3}{64}$ to $\frac{3}{32}$ in. (1,3 to 2,4 mm)	
Camber angle	....	....	....	....	....	....	....	$1\frac{1}{2}^\circ$	
Castor angle	....	....	....	....	....	....	....	3°	
Swivel pin inclination	....	....	....	....	....	....	....	7°	

Capacities

Component	Imperial unit	US unit	Litres
Engine sump oil, 4-cylinder	11 pints	13 pints	6,0
Engine sump oil, 6-cylinder	10 pints	12 pints	5,75
Extra when refilling after fitting new filter, 4-cylinder	1½ pints	1.8 pints	0,85
Extra when refilling after fitting new filter, 6-cylinder	1 pint	1.2 pints	0,5
Air cleaner oil, 4-cylinder	1½ pints	1.8 pints	0,85
Air cleaner oil, 6-cylinder	1 pint	1.2 pints	0,5
Main gearbox oil	2½ pints	3 pints	1,5
Transfer box oil	4½ pints	5½ pints	2,5
Rear differential } Standard and limited	3 pints	3½ pints	1,75
Front differential } slip type	3 pints	3½ pints	1,75
Rear differential } ENV	2⅛ pints	2½ pints	1,2
Front differential } type	2⅝ pints	3.1 pints	1,4
Swivel pin housing oil (each)	1 pint	1.2 pints	0,5
Fuel tank, except 'Long' Station Wagon and Forward Control	10 gallons	12 gallons	45
Fuel tank, 'Long' Station Wagon and Forward Control	16 gallons	19 gallons	73
Cooling system, 4-cylinder Petrol models, except Forward Control	18 pints	21½ pints	10,25
Cooling system, 4-cylinder Petrol Forward Control models	19 pints	22¾ pints	10,8
Cooling system, 6-cylinder Petrol Forward Control models	23 pints	27¾ pints	13,0
Cooling system, 6-cylinder 'Long' models	20 pints	24 pints	11,2
Cooling system, Diesel models 'Regular' and 'Long'	17½ pints	21 pints	10,0
Cooling system, Diesel models Forward Control	18 pints	21½ pints	10,5
Hydraulic front winch, supply tank	4½ gallons	7½ gallons	20,0
Hydraulic front winch, gearbox	2 pints	2.4 pints	1,0

Recommended lubricants and fluids

These recommendations apply to temperate climates where operational temperatures may vary between approximately 10°F (-12°C) and 90°F (32°C).

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

Information on oil recommendations for use under extreme winter or tropical conditions can be obtained from your local Rover Distributor or Dealer or The Rover Co. Ltd., Technical Service Department.

COMPONENTS	SAE	BP	CASTROL	DUCKHAM'S	ESSO	MOBIL	REGENT TEXACO- CALTEX	SHELL
Petrol models Engine, air cleaner and governor	20W	*BP Super Visco-Static 10W-40	*Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Arctic	Havoline 20/20W	*Shell Super Oil
Diesel models Engine and air cleaner	20W	BP Energol Diesel D20W	Castrol CRI20	NOL Diesel Engine Oil 20	Essofleet HD20	Mobiloil Arctic	RPM Delo Special 20	Rotella 20/20W
Gearbox and transfer box *Differentials and swivel pin housings Steering box Steering relay unit Rear power take-off, pulley unit and capstan winch hydraulic winch gearbox	90EP	BP Energol SAE 90EP	Castrol Hypoy	Duckham's Hypoid 90	Esso Gear Oil GP 90/140	Mobilube GX 90	Multigear Lubricant 90	Spirax 90 EP
Hydraulic winch supply tank	—	*BP Super Visco-Static 10W-40	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energol L2	Castrol LM	Duckham's LB10 Grease	Esso Multi- purpose Grease H	Mobilgrease MP or Mobil- grease Special	Marfak Multi- purpose 2	Retinax A
Brake and clutch fluid	Castrol Girling 'Crimson' Brake and Clutch Fluid Specification SAE 70 R3							
Anti-freeze solution	Any anti-freeze solution conforming to British Standard No. BS 3152							

*Rear differential, limited-slip type: Castrol 90EP-LS, Fina Pontonic Plus, Shell Limited-Slip Differential Oil S6721A or Mobilube 46—available in the UK market.
Pure Oil TSS90, Texaco 3450 or Mobil 46—available in the North America Dollar area.

Dimensions and Weights	'Regular'		'Regular' Station Wagon		'Long'		'Long' Station Wagon		110 Forward Control	
	British	Metric	British	Metric	British	Metric	British	Metric	British	Metric
Overall length	142½ in.	3,62 m	142½ in.	3,62 m	175 in.	4,44 m	175 in.	4,44 m	193 in.	4,90 m
Overall width	66 in.	1,68 m	66 in.	1,68 m	66 in.	1,68 m	66 in.	1,68 m	75½ in.†	1,92 m†
Overall unladen height, hood up	77½ in.	1,97 m	—	—	—	—	—	—	—	—
Overall unladen height, hood down, screen up	68 in.	1,73 m	—	—	—	—	—	—	—	—
Overall unladen height, hood down, screen down	57½ in.	1,46 m	—	—	—	—	—	—	—	—
Overall unladen height, with cab or hard top	76½ in.	1,95 m	77½ in.	1,98 m	81 in.	2,06 m	81½ in.	2,07 m	88½ in.	2,24 m
Wheelbase	88 in.	2,23 m	88 in.	2,23 m	109 in.	2,77 m	109 in.	2,77 m	109½ in.	2,77 m
Track	51½ in.	1,31 m	51½ in.	1,31 m	51½ in.	1,31 m	51¼ in.	1,31 m	57½ in.	1,36 m
Turning circle	38 ft.	11,6 m	38 ft.	11,6 m	47 ft.	14,3 m	47 ft.	14,3 m	48 ft.	15,8 m
Unladen ground clearance under differentials, 6.00 x 16 tyres	8 in.	203 mm	8 in.	203 mm	—	—	—	—	—	—
Unladen ground clearance under differentials, 7.00 x 16 tyres	8½ in.	222 mm	8½ in.	222 mm	—	—	—	—	—	—
Unladen ground clearance under differentials, 7.50 x 16 tyres	—	—	—	—	9½ in.	248 mm	9½ in.	248 mm	—	—
Unladen ground clearance under differentials, 9.00 x 16 tyres	—	—	—	—	—	—	—	—	10 in.	254 mm
Weight running, with water, oil, 5 gallons fuel:										
Petrol models	2,953 lb.	1,339 kg	3,281 lb.	1,488 kg	3,301 lb.	1,497 kg	3,752 lb.	1,702 kg	4,340 lb.	1,970 kg
Diesel models	3,097 lb.	1,405 kg	3,435 lb.	1,557 kg	3,471 lb.	1,574 kg	3,922 lb.	1,778 kg	4,505 lb.	2,043 kg

† With two exterior mirrors

Dimensions and Weights	'Regular'		'Regular' Station Wagon		'Long'		'Long, Station Wagon		110 Forward Control	
	British	Metric	British	Metric	British	Metric	British	Metric	British	Metric
Maximum approved pay load, normal roads	*Driver, two passengers and: 1,000 lb. 454 kg		*7 persons and: 100 lb. 45 kg		Driver, two passengers and: 2,000 lb. 908 kg		10 persons and: 400 lb. 181 kg		2 persons and: 3,360 lb. 1,525 kg	
Maximum approved pay load, cross-country	Driver, two passengers and: 800 lb. 363 kg		6 persons and: 50 lb. 23 kg		Driver, two passengers and: 1,800 lb. 816 kg		10 persons and: 200 lb. 91 kg		2 persons and: 2,800 lb. 1,270 kg	
Maximum drawbar pull, dependent upon surface conditions:										
Petrol models	4,000 lb.	1,800 kg	4,000 lb.	1,800 kg	3,500 lb.	1,600 kg	3,500 lb.	1,600 kg	4,000 lb.**	1,800 kg**
Diesel models	3,300 lb.	1,497 kg	3,300 lb.	1,497 kg	2,900 lb.	1,315 kg	2,900 lb.	1,315 kg	4,000 lb.	1,800 kg
Internal body dimensions:										
length (between cappings)	43 in.	1,09 m	—	—	72½ in.	1,85 m	—	—	123½ in.††	3,14 m††
width (between cappings)	56½ in.	1,44 m	—	—	56½ in.	1,44 m	—	—	63½ in.††	1,61 m††
depth	19½ in.	495 mm	—	—	19 in.	483 mm	—	—	—	—
height of wheel arch	8½ in.	216 mm	—	—	9 in.	229 mm	—	—	—	—
width of wheel arch (to body side)	13¾ in.	349 mm	—	—	13¾ in.	349 mm	—	—	—	—
width of floor (between wheel arches)	36½ in.	921 mm	—	—	36½ in.	921 mm	—	—	—	—
height, floor to roof (maximum)	48½ in.	1,23 m	—	—	48 in.	1,22 m	—	—	—	—

* Maximum loads for cross-country when heavy duty springs are fitted.

** Forward Control 6-cylinder models, 4,350 lb. (1,973 kg)

†† Loading area.

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PART FOUR

LAND-ROVER FREE SERVICE AND MAINTENANCE SCHEDULES

The regular carrying out of the following scheduled services is an extremely important factor in maintaining the value of the vehicle and contributing to its reliability.

Your attention is particularly drawn to the need for more frequent maintenance attention to certain units, as shown on the sheets that follow, when the Land-Rover is used under arduous conditions or when wading.

Maintenance attention information for items of optional equipment, that is, power take-off, hydraulic winch, etc, will be found in Part One of this book and also in the Optional Equipment Book, copies of which can be obtained free of charge from: The Rover Company Limited, Technical Service Department, Solihull, Warwickshire, England.

In addition to the regular maintenance schedules, details are also provided of the work to be done at the Free Service Inspection after the vehicle has covered approximately its first 1,000 miles (1.500 km).

Provision has been made in the book for a certifying signature that the various services have been carried out so that there is a permanent record of these having been completed.

Whilst it is intended that this part of the book should be used in conjunction with the Maintenance Section, particulars are none the less included as to recommended lubricants and other important maintenance data.

It will be noted that certain maintenance work which is required from time to time has been omitted from these schedules. This will include such work as decarbonising, brake relining, etc, the need for which will vary very much according to circumstances, and Rover Distributors or Dealers should be consulted about such points at the time other service work is being carried out.

SUMMARY OF MAINTENANCE ATTENTION

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 4,000 miles (6,000 km) or every four months, whichever comes first.
3. Every month check tyre pressures and inspect tyre treads.
4. Every month check brake fluid level and battery acid level.
5. Owners are under a legal obligation to maintain all exterior lights in order, this also applies to headlamp beam setting, which should be checked at regular intervals by a Rover Distributor or Dealer.
6. For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book.

AT 1,000 MILES (1.500 KM)

Free service.

AT 4,000 MILES (6.000 KM)

Drain and refill engine.

Forward Control models: Lubricate fan drive shaft.

Air cleaner, oil bath type: Empty, clean and refill.

Petrol models: Check carburettor slow running.

Petrol models: Check sparking plugs.

Petrol models: Check distributor contact points.

Petrol models: Lubricate and clean distributor.

Check belt adjustment.

Check water level in radiator.

Check gearbox and transfer box oil level.

Drain flywheel housing, when drain plug is fitted.

Check fluid level in clutch reservoir.

Check battery acid level and specific gravity of electrolyte.

Check oil level in differentials.

Check oil level in front swivel pin housings.

Check oil level in steering box.

Check rubber boots on steering joints.

Check fluid level in brake reservoir.

Check and, if necessary, adjust brake shoes.

Check and, if necessary, adjust handbrake shoes.

Change round all road wheels.

Check tyre pressures and inspect tyre treads

Lubricate propeller shafts.

Road test.

AT 8,000 MILES (12.000 KM)

As 4,000 miles (6,000 km) plus

Renew external oil filter.

Clean breather filter.

Clean crankcase emission control, diaphragm type, where fitted.

Petrol models, 6-cylinder: Clean crankcase breather filter.

Petrol models, 6-cylinder: Oil carburettor hydraulic damper.

Petrol models: Replace sparking plugs.

Check tappet clearance.

Clean, grease and tighten battery terminals.

Check headlamps beam setting.

Check lights and instruments for correct operation.

SUMMARY OF MAINTENANCE ATTENTION—continued**AT 12,000 MILES (18,000 KM)**

As 4,000 miles (6,000 km) plus

Petrol models: Clean fuel sediment bowl.

Diesel models: Remove injectors, check and, if necessary, adjust.

Diesel models: Renew fuel filter element.

Diesel models, 'Regular' and 'Long': Clean fuel sediment bowl.

Diesel models, Forward Control: Clean sedimenter

Lubricate dynamo.

Drain and refill gearbox and transfer box.

Drain and refill differentials.

Drain and refill front swivel pin housings.

Check all body bolts.

Check 'U' bolts and spring clips.

Check propeller shaft bolts.

Oil throttle linkage joints, door locks and hinges, bonnet prop rod, etc.

Lubricate front propeller shaft sliding joints, as applicable.

AT 16,000 MILES (24,000 KM)

As 4,000 miles (6,000 km) and 8,000 miles (12,000 km).

AT 20,000 MILES (30,000 KM)

As 4,000 miles (6,000 km), plus

Clean crankcase emission control, flame-trap type, where fitted.

AT 24,000 MILES (36,000 KM)

As 4,000 miles (6,000 km), 8,000 miles (12,000 km) and 12,000 miles (18,000 km) plus:

Diesel models: Second filter when two filters fitted.

Lubricate front propeller shaft sliding joint.

IMPORTANT NOTE:

Renew all rubber seals and fluid in brake system every three years if mileage covered is less than 40,000 miles (64,000 km). Refill with Castrol Girling 'Crimson Brake Fluid, Specification SAE 70 R3.

LAND-ROVER
NEW VEHICLE
PRE-DELIVERY
INSPECTION

LAND-ROVER
NEW VEHICLE PRE-DELIVERY INSPECTION

The Pre-delivery Inspection *must* be carried out in a thorough manner before the vehicle is delivered

The following sequence of operations under the headings of Engine Compartment, Passenger/Load Compartment Underbody, Road Test and Final Preparation will enable this work to be carried out in the most efficient manner

Carried out by
Rover Distributor or
Dealer

NAME.....

ADDRESS.....

We certify that the New Vehicle
Pre-delivery Inspection has
been completed

Signature.....

Date.....

ENGINE COMPARTMENT—vehicle on a level floor

1. Check engine sump and steering box oil levels.
2. Check radiator fluid level (anti-freeze specific gravity in winter).
3. Check windscreen washer reservoir (where fitted) (methylated spirits in winter).
4. Check battery electrolyte level and battery post terminals for security.
5. Check the clutch and the brake reservoir fluid level.
6. Check the belt adjustment. See Part One in this book.
7. Check for security all electrical connections on dynamo, starter, voltage regulator, fuse box, oil pressure switch, thermostat switch and brake stop lamp switch.
Petrol models. Check for security electrical connections on coil, distributor, high and low tension cables.
8. **Diesel models.** Check all pipes on distributor pump and injectors, fuel filters and mechanical fuel lift pump.
9. **Diesel models.** Check heater plug connection, also all other engine compartment electrical connections.
10. Check water hoses, drain taps and heater pipe connections (where fitted) for leakage: check tightness of hose clips.
11. Check bonnet lock and safety catch.

PASSENGER/LOAD COMPARTMENT—vehicle on the floor

12. Check the door locks, safety catches, seals, sliding windows and door check stops (private locks where fitted) for correct operation.
13. Check adjustable driver's seat for adjustment and security.
14. Check windscreen ventilators for fit and easy operation.
15. Check handbrake for operation.
16. Check side and head positions on lighting switch and the floor dipper switch, making sure that the main beam warning light operates correctly. Check interior light where fitted.
17. Check the horn button and horn.
18. Check the flasher switch, flasher lamps and warning light (where fitted).
19. Switch on the ignition and check the following—ignition and oil pressure warning lights, fuel gauge, ammeter, windscreen wipers and the brake stop light (on Diesel models the services control key is inserted in the centre of the starter switch).
20. Check the battery acid level and specific gravity of electrolyte, also that the battery post terminals and the battery fixings are secure.

NEW VEHICLE PRE-DELIVERY INSPECTION

CONTINUED OVERLEAF

LAND-ROVER

NEW VEHICLE PRE-DELIVERY INSPECTION—*continued*

UNDERBODY—vehicle on ramp

21. Check all wheel securing nuts for tightness, and spare wheel stowage. Carry out a general underbody examination, checking all hydraulic connections.
22. Check the front and rear differential oil levels.
23. Check the gearbox and transfer box oil levels.
24. Check the flywheel housing drain plug, which should be in its stowage bracket.
25. Check the swivel pin housing oil levels.
26. Check the security of the exhaust pipes and silencer.
27. Check all tyre pressures, including spare, and replace all dust caps. (For correct tyre pressures see 'Data' Section).

ROAD TEST

28. Switch on the ignition (service key on the Diesel model inserted in the centre of the starter switch) and start the engine.
29. Check the ignition and oil pressure warning lights for correct operation.
30. **Diesel models.** Check the operation of the governor quadrant control.
31. Take the vehicle on a short road test and check the complete range of gears in both high and low range, checking the operation of the high range four-wheel drive control

32. Check the clutch, brakes and steering.
33. Check the speedometer for speed and mileage recording.
34. Check for any abnormal noises.
35. Check the heater and rheostat control and the demisters (where fitted).
36. Check the choke warning light by operating the choke control momentarily.
37. **Petrol models.** Switch off the ignition.
Diesel models. Check the engine stop control, also switch off electrical services.
38. Check the tool kit.

FINAL PREPARATION

39. Wash the vehicle and ensure interior and exterior cleanliness.
40. Check for damage to bodywork and paintwork.
41. Check windscreen and side screens for scratches or blemishes.
42. Make sure the owner is thoroughly conversant with all the controls, particularly the transfer box and the four-wheel drive control in high range. If necessary, go out for a short run with the owner.
43. Check that all literature is complete.

LAND-ROVER

FREE SERVICE UNDER NORMAL ROAD CONDITIONS AT 1,000 MILES (1.500 KM)

LAND-ROVER
FREE SERVICE AT
1,000 MILES (1.500 KM)
Carried out by
Rover Distributor or Dealer

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

Owner's signature.....authorising
work detailed below to be carried out

Special attention should be given to any complaints made by the owner

NAME.....

ADDRESS.....

We certify that the Free Service
has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

Engine

Check oil level
daily or weekly,
depending on
operating conditions.

Clean air cleaner
daily or twice daily
under really severe
conditions of dust
or when wading.

Check water level
daily or weekly,
depending on
operating conditions.

Drain water from
sedimenter on
Forward Control
Diesel models,
monthly,
depending on
operating conditions.

**Gearbox and
transfer box**

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

Check for oil leakage, note and report for rectification and action.
Drain and refill engine sump.
Empty, clean and refill oil bath air cleaner.
Petrol models: Check sparking plugs. Gap .029 to .032 in. (0,75 to 0,80 mm).

Diesel models: Tighten cylinder head bolts; also remove, check and, if necessary, adjust injectors.
Check tappet clearance. 4-cylinder: Inlet and exhaust .010 in. (0,25 mm). 6-cylinder: Inlet .006 in. (0,15 mm). Exhaust .010 in. (0,25 mm). Engine hot.

Petrol models: Check carburettor slow running at normal running temperature; also check for signs of leaks or flooding.
Petrol models: Lubricate and clean distributor.
Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,30 to 0,40 mm).

Check water level in radiator, 1/2 to 3/4 in. (12 to 19 mm) below bottom of filler neck. Check anti-freeze specific gravity in winter.
Check fluid level in windscreen washer reservoir (when fitted).
Check belt adjustment. See Part One of this book.
Lubricate accelerator linkage and check for correct operation.
Check dynamo and exhaust manifold fixings.
Check engine mounting brackets and rubbers.

Note and report any excessive oil leaks for rectification and action.
Drain and refill gearbox and transfer box.
Drain flywheel housing when drain plug is fitted for wading.
Check gearbox mounting brackets and rubbers.
Lubricate main gear lever spherical ball and transfer gear lever linkage.

Drain and refill
gearbox and transfer
box monthly when
operating under
severe wading
conditions.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter.
Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Fuel system

Diesel models:
Prime fuel system
after carrying out
operations marked
with an asterisk*.

Petrol models:
Clean sediment bowl and filter.
Diesel models:
*Clean sediment bowl and filter.

Check all fuel pipes and connections for leakage.

Absolute cleanliness
is essential when
dealing with the
Diesel fuel system.

Filters will need
more frequent
attention if poor
quality fuel is used.

Electrical

Check battery acid
level weekly when
operating under
severe conditions.

Check battery acid level and specific gravity of electrolyte, also all electrical connections.
Clean, grease and tighten battery terminals

General

Apply a few spots of oil to throttle linkage joints, door locks and hinges, bonnet prop rod, etc.

CONTINUED OVERLEAF

FREE SERVICE AT 1,000 MILES (1.500 KM)

LAND-ROVER

FREE SERVICE UNDER NORMAL ROAD CONDITIONS AT 1,000 MILES (1.500 KM)

—continued

Axles, front and rear

Drain and refill axles and swivel housings monthly when operating under severe wading conditions.

Steering box and ball joints

Check rubber boots daily when operating under arduous conditions.

Brakes

Clean out brake drums weekly when wading in deep muddy conditions.

Wheels and tyres

Check tyre pressures monthly.

Body and road springs

Note and report any excessive oil leaks or rectification and action.

Drain and refill differentials.

Drain and refill front swivel pin housings.

Check oil level, top up if necessary to bottom of filler plug hole.

Check that rubber boots on steering ball joints are not dislodged or damaged.

Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).
Check brake pipes and hoses for chafing and looseness. Report any defects.

Check tyre pressures and inspect tyre treads

Check all road wheel securing nuts.

Check all body bolts for tightness.

Check security of 'U' bolts and spring clips.

Check straps on rear axle.

Check all body bolts for tightness.

Check all door locks, safety catches and door travel limit stops.

Propeller shafts, front and rear

Lubricate sliding joints daily under really severe conditions or when wading.

General

Road test

*Lubricate sliding joints and journals as applicable.

*Check securing bolts for tightness.

*Applies also to fan drive shaft on Forward Control models.

Apply a few spots of oil to throttle linkage joints, door locks and hinges, bonnet prop rod, etc.

Give vehicle a thorough road test and carry out any further adjustment required, including brakes, clutch, throttle linkage, etc.

Check steering and all gears in high and low range, including the high range four-wheel drive control. See Owner's Instruction Manual for operating information.

Check operation of all lights and instruments.

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

Wipe clean all controls, handles, etc. Clean windscreen and lights, interior and exterior of vehicle.

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 4,000 MILES (6.000 KM)

MAINTENANCE ATTENTION AT 4,000 MILES (6.000 KM)

MAINTENANCE ATTENTION AT 4,000 MILES (6.000 KM)

Carried out by Rover Distributor or Dealer

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

NAME

Owner's signature.....authorising work detailed below to be carried out

ADDRESS

We certify that the 4,000 miles (6,000 km) maintenance attention has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

Engine

Check oil level daily or weekly, depending on operating conditions.

Clean air cleaner daily or twice daily under really severe conditions of dust or when wading.

Check water level daily or weekly, depending on operating conditions.

Drain water from sedimenter on Forward Control Diesel models monthly, depending on operating conditions.

Drain and refill engine sump.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Petrol models: Check carburettor slow running.

Petrol models: Check sparking plugs. Gap .029 to .032 in. (0,75 to 0,80 mm). Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.

Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,35 to 0,40 mm).

Petrol models: Lubricate and clean distributor.

Check belt adjustment. See Part One in this book.

Check water level in radiator (anti-freeze in winter), 1/2 to 3/4 in. (12 to 19 mm) below bottom of filler neck.

Gearbox and transfer box

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

Drain and refill gearbox and transfer box monthly when operating under severe wading conditions.

Check oil level, top up if necessary to bottom of filler plug holes.

Drain flywheel housing when drain plug is fitted for wading.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter or filler. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level and specific gravity of electrolyte.

MAINTENANCE ATTENTION AT 4,000 MILES (6.000 KM)—*continued*

Axles, front and rear †

Check oil level in differentials, top up if necessary to bottom of filler plug holes.

Check oil level in front swivel pin housings, top up if necessary to bottom of filler plug holes.

Steering box and ball joints †

Check rubber boots daily when operating under arduous conditions.

Check oil level, top up if necessary to bottom of filler plug hole.

Check that rubber boots on steering ball joints are not dislodged or damaged.

Brakes †

Clean out brake drums weekly when wading in deep muddy conditions.

Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid Specification SAE 70 R3).

Check and, if necessary, adjust brake shoes.

Check and, if necessary, adjust handbrake shoes.

See also Road Test.

Wheels and tyres

Check tyre pressures monthly.

Propeller shafts

Lubricate sliding joints daily under really severe conditions or when wading.

Road test

Change round all road wheels.

Check tyre pressures and inspect tyre treads.

Lubricate propeller shafts.

Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc.

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

Check brake pipes and hoses for chafing and looseness. Report any defects.

Wipe clean all controls, handles, etc. Clean windscreen and lights.

† Items marked with a dagger (†) do not require such frequent maintenance attention when the vehicle is used under stationary working conditions

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 8,000 MILES (12.000 KM)

**MAINTENANCE
ATTENTION AT
8,000 MILES (12.000 KM)**

**Carried out by
Rover Distributor or Dealer**

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

NAME.....

Owner's signature.....authorising
work detailed below to be carried out

ADDRESS.....

We certify that the 8,000 miles
(12,000 km) maintenance
attention has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Engine

*Check oil level
daily or weekly,
depending on
operating conditions.
Clean air cleaner
daily or twice daily
under really severe
conditions of dust
or when wading.*

*Check water level
daily or weekly,
depending on
operating conditions.*

*Drain water from
sedimenter on
Forward Control
Diesel models
monthly, depending on
operating conditions.*

Drain and refill engine sump.

Renew external oil filter.

Clean breather filter.

Petrol models, 6-cylinder: Clean crankcase breather filter.

Clean crankcase emission control, diaphragm type, as applicable.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Petrol models: Check carburetter slow running.

Petrol models, 6-cylinder: Oil carburetter hydraulic damper.

Petrol models: Replace sparking plugs Gap .029 to .032 in. (0,75 to 0,80 mm). Use only Champion N8. for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.

Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,35 to 0,40 mm).

Petrol models: Lubricate and clean distributor.

Check tappet clearance. 4-cylinder: Inlet and exhaust .010 in. (0,25 mm). 6-cylinder: Inlet .006 in (0,15 mm). Exhaust .010 in. (0,25 mm). Engine hot.

Check belt adjustment. See Part One in this book.

Check water level in radiator (anti-freeze in winter), $\frac{1}{4}$ to $\frac{1}{2}$ in. (12 to 19 mm) below bottom of filler neck.

Gearbox and transfer box

*Check oil level
daily or weekly
when operating
under severe
stationary
working conditions.*

*Drain and refill
gearbox and
transfer box monthly
when operating
under severe
wading conditions.*

Check oil level, top up if necessary to bottom of filler plug holes.

Drain flywheel housing when drain plug is fitted for wading.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter or filler. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

*Check battery acid
level weekly when
operating under
severe conditions.*

Check battery acid level and specific gravity of electrolyte.

Clean, grease and tighten battery terminals.

Hours.....

Date.....

MAINTENANCE ATTENTION AT 8,000 MILES (12.000 KM)

MAINTENANCE ATTENTION AT 8,000 MILES (12,000 KM)—continued

Axles, front and rear †	Check oil level in differentials, top up if necessary to bottom of filler plug hole.	Propeller shafts <i>Lubricate sliding joints daily under really severe conditions or when wading.</i>	Lubricate propeller shafts.
Steering box and ball joints † <i>Check rubber boots daily when operating under arduous conditions.</i>	Check oil level in front swivel pin housings, top up if necessary to bottom of filler plug holes. Check oil level, top up if necessary to bottom of filler plug hole. Check that rubber boots on steering ball joints are not dislodged or damaged.	Electrical †	Check headlamp beam setting. Check lights and instruments for correct operation.
Brakes † <i>Clean out brake drums weekly when wading in deep muddy conditions.</i>	Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3) Check and, if necessary, adjust brake shoes. Check and, if necessary, adjust handbrake shoes. See also Road Test.	Road test	Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc. After test, check for oil, fuel and fluid leaks at all plugs, flanges, joints and unions. Check brake pipes and hoses for chafing and looseness. Report any defects. Wipe clean all controls, handles, etc. Clean windscreen and lights.
Wheels and tyres <i>Check tyre pressures monthly.</i>	Change round all road wheels. Check tyre pressures and inspect tyre treads.		

† Items marked with a dagger (†) do not require such frequent maintenance attention when the vehicle is used under stationary working conditions

MAINTENANCE ATTENTION AT 12,000 MILES (18,000 KM)

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 12,000 MILES (18,000 KM)

Carried out by
 your Distributor or Dealer

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

Name.....

Owner's signature.....authorising
 work detailed below to be carried out

Address.....

I certify that the 12,000 miles (18,000 km) maintenance attention has been completed

Signature.....

Age.....

Model Petrol/Diesel

Gallons.....

Litres.....

Hours.....

.....

Engine

Check oil level daily or weekly, depending on operating conditions.

Clean air cleaner daily or twice daily under really severe conditions of dust or when wading.

Check water level daily or weekly, depending on operating conditions.

Drain water from sedimenter on Forward Control Diesel models monthly, depending on operating conditions.

Drain and refill engine sump.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Petrol models: Check carburettor slow running.

Petrol models: Clean fuel sediment bowl.

Petrol models: Check sparking plugs. Gap .029 to .032 in. (0.75 to 0.80 mm). Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.

Petrol models: Check distributor contact points. Gap .014 to .016 in. (0.35 to 0.40 mm)

Petrol models: Lubricate and clean distributor.

Diesel models: Remove injectors and if necessary, adjust.

Diesel models: Renew fuel filter element.

Diesel models: Clean fuel sediment bowl.

Diesel models, Forward Control: Clean sedimenter.

Check belt adjustment. See Part One in this book.

Lubricate dynamo.

Check water level in radiator (anti-freeze in winter), $\frac{1}{2}$ to $\frac{3}{4}$ in. (12 to 19 mm) below bottom of filler neck.

Gearbox and transfer box

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

Drain and refill gearbox and transfer box monthly when operating under severe wading conditions.

Drain and refill gearbox and transfer box.

Drain flywheel housing when drain plug is fitted for wading.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level and specific gravity of electrolyte.

MAINTENANCE ATTENTION AT 12,000 MILES (18,000 KM)

MAINTENANCE ATTENTION AT 12,000 MILES (18.000 KM)—*continued*

Axles, front and rear †	<p>Drain and refill differential.</p> <p>Drain and refill front swivel pin housings.</p>	Body and road springs †	<p>Check all body bolts for tightness.</p> <p>Check security of 'U' bolts and spring clips.</p> <p>Check propeller shaft bolts for tightness.</p>
<p>Steering box and ball joints †</p> <p><i>Check rubber boots daily when operating under arduous conditions.</i></p>	<p>Check oil level, top up if necessary to bottom of filler plug hole.</p> <p>Check that rubber boots on steering ball joints are not dislodged or damaged.</p>	<p>Propeller shafts, front and rear †</p> <p><i>Lubricate sliding joints daily under really severe conditions or when wading.</i></p>	<p>*Lubricate sliding joints and journals as applicable.</p>
<p>Brakes †</p> <p><i>Clean out brake drums weekly when wading in deep muddy conditions.</i></p>	<p>Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).</p> <p>Check and, if necessary, adjust brake shoes.</p> <p>Check and, if necessary, adjust handbrake shoes.</p> <p>See also Road Test.</p>	<p>General</p>	<p>Oil throttle linkage joints, door locks and hinges, bonnet prop rod, etc.</p>
<p>Wheels and tyres</p> <p><i>Check tyre pressures monthly.</i></p>	<p>Change round all road wheels.</p> <p>Check tyre pressures and inspect tyre treads.</p>	<p>Road test</p>	<p>Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc.</p> <p>After test, check for oil, fuel and fluid leaks at all plugs, flanges, joints and unions.</p> <p>Check brake pipes and hoses for chafing and looseness. Report any defects.</p> <p>Wipe clean all controls handles, etc. Clean windscreen and lights.</p>

† Items marked with a dagger (†) do not require such frequent maintenance attention when the vehicle is used under stationary working conditions

**MAINTENANCE
ATTENTION AT
16,000 MILES (24,000 KM)**

**MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT
16,000 MILES (24,000 KM)**

**Carried out by
Rover Distributor or Dealer**

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

NAME.....

Owner's signature.....authorising
work detailed below to be carried out

ADDRESS.....

We certify that the 16,000 miles
(24,000 km) maintenance
attention has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

Engine

Check oil level
daily or weekly,
depending on
operating conditions.

Clean air cleaner
daily or twice daily
under really severe
conditions of dust
or when wading.

Check water level
daily or weekly,
depending on
operating conditions.

Drain water from
sedimenter on
Forward Control
Diesel models
monthly, depending on
operating conditions.

Drain and refill engine sump.

Renew external oil filter.

Clean breather filter

Petrol models, 6-cylinder: Clean crankcase breather filter.

Clean crankcase emission control, diaphragm type, as applicable.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Petrol models: Check carburettor slow running.

Petrol models, 6-cylinder: Oil carburettor hydraulic damper.

Petrol models: Replace sparking plugs. Gap .029 to .032 in. (0,75 to 0,80 mm). Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.

Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,35 to 0,40 mm).

Petrol models: Lubricate and clean distributor.

Check tappet clearance. 4-cylinder: Inlet and exhaust .010 in. (0,25 mm). 6-cylinder: Inlet .006 in. (0,15 mm). Exhaust .010 in. (0,25 mm). Engine hot.

Check belt adjustment. See Part One in this book.

Check water level in radiator (anti-freeze in winter), $\frac{1}{8}$ to $\frac{3}{8}$ in. (12 to 19 mm) below bottom of filler neck.

Gearbox and transfer box

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

Drain and refill
gearbox and
transfer box
monthly when
operating under
severe wading
conditions.

Check oil level, top up if necessary to bottom of filler plug holes.

Drain flywheel housing when drain plug is fitted for wading.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter or filler. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

Check battery acid
level weekly when
operating under
severe conditions.

Check battery acid level and specific gravity of electrolyte.

Clean, grease and tighten battery terminals.

MAINTENANCE ATTENTION AT 16,000 MILES (24,000 KM)

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 16,000 MILES (24,000 KM)—continued

Axles, front and rear †

Check oil level in differentials, top up if necessary to bottom of filler plug hole.

Check oil level in front swivel pin housings, top up if necessary to bottom of filler plug holes.

Steering box and ball joints †

Check rubber boots daily when operating under arduous conditions.

Check oil level, top up if necessary to bottom of filler plug hole.

Check that rubber boots on steering ball joints are not dislodged or damaged.

Brakes †

Clean out brake drums weekly when wading in deep muddy conditions.

Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Check and, if necessary, adjust brake shoes.

Check and, if necessary, adjust handbrake shoes.

See also Road Test.

Wheels and tyres

Check tyre pressures monthly.

Change round all road wheels.

Check tyre pressures and inspect tyre treads.

Propeller shafts

Lubricate sliding joints daily under really severe conditions or when wading.

Lubricate propeller shafts.

Electrical

Check headlamp beam setting.

Check lights and instruments for correct operation.

Road test

Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc.

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

Check brake pipes and hoses for chafing and looseness. Report any defects.

Wipe clean all controls, handles, etc. Clean windscreen and lights.

†Items marked with a dagger (†) do not require such frequent maintenance attention when the vehicle is used under stationary working conditions

MAINTENANCE ATTENTION AT 20,000 MILES (30.000 KM)

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 20,000 MILES (30.000 KM)

Carried out by
over Distributor or Dealer

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

NAME.....

Owner's signature..... authorising
work detailed below to be carried out

ADDRESS.....

I hereby certify that the 20,000 miles (30,000 km) maintenance attention has been completed

Signature.....

Vehicle registration.....

Model.....

Fuel Petrol/Diesel

Gallons

Litres

Hours.....

Date.....

Engine

Check oil level daily or weekly, depending on operating conditions.

Clean air cleaner daily or twice daily under really severe conditions of dust or when wading.

Check water level daily or weekly, depending on operating conditions.

Drain water from sedimenter on Forward Control Diesel models monthly, depending on operating conditions.

Drain and refill engine sump.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Clean crankcase emission control, flame-trap type, as applicable.

Petrol models: Check carburettor slow running.

Petrol models: Check sparking plugs. Gap .029 to .032 in. (0,75 to 0,80 mm). Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.

Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,35 to 0,40 mm).

Petrol models: Lubricate and clean distributor.

Check belt adjustment. See Part One in this book.

Check water level in radiator (anti-freeze in winter), $\frac{1}{4}$ to $\frac{3}{4}$ in. (12 to 19 mm) below bottom of filler neck.

Gearbox and transfer box

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

Drain and refill gearbox and transfer box monthly when operating under severe wading conditions.

Check oil level, top up if necessary to bottom of filler plug holes.

Drain flywheel housing when drain plug is fitted for wading.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter or filler. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level and specific gravity of electrolyte.

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 20,000 MILES (30.000 KM)

MAINTENANCE ATTENTION AT 20,000 MILES (30,000 KM)—*continued*

Axles, front and rear †

Check oil level in differentials, top up if necessary to bottom of filler plug holes.

Check oil level in front swivel pin housings, top up if necessary to bottom of filler plug holes.

Steering box and ball joints †

Check rubber boots daily when operating under arduous conditions.

Check oil level, top up if necessary to bottom of filler plug hole.

Check that rubber boots on steering ball joints are not dislodged or damaged.

Brakes †

Clean out brake drums weekly when wading in deep muddy conditions.

Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Check and, if necessary, adjust brake shoes.

Check and, if necessary, adjust handbrake shoes.

See also Road Test.

Wheels and tyres

Check tyre pressures monthly.

Change round all road wheels.

Check tyre pressures and inspect tyre treads.

Propeller shafts

Lubricate sliding joints daily under really severe conditions or when wading.

Lubricate propeller shafts

Road test

Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc.

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

Check brake pipes and hoses for chafing and looseness. Report any defects.

Wipe clean all controls, handles, etc. Clean windscreen and lights.

MAINTENANCE ATTENTION AT 24,000 MILES (36,000 KM)

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 24,000 MILES (36,000 KM)

Carried out by
over Distributor or Dealer

For capacities, recommended lubricants, tyre pressures and conversion chart for maintenance based on fuel consumption or hours' running time, see end of book

Name.....

Owner's signature.....authorising
work detailed below to be carried out

Address.....

I certify that the 24,000 miles (36,000 km) maintenance attention has been completed

Signature.....

Vehicle.....

Registration.....

Model Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

Engine

Check oil level daily or weekly, depending on operating conditions.

Clean air cleaner daily or twice daily under really severe conditions of dust or when wading.

Check water level daily or weekly, depending on operating conditions.

Drain water from sedimentor on Forward Control Diesel models monthly, depending on operating conditions.

- Drain and refill engine sump.
- Renew external oil filter.
- Clean breather filter.
- Petrol models, 6-cylinder: Clean crankcase breather filter.
- Clean crankcase emission control, diaphragm type, as applicable.
- Forward Control models: Lubricate fan drive shaft.
- Empty, clean and refill oil bath air cleaner.
- Petrol models: Check carburettor slow running.
- Petrol models: Replace sparking plugs. Gap .029 to .032 in. (0,75 to 0,80 mm). Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models as service replacements.
- Petrol models, 6-cylinder: Oil carburettor hydraulic damper.
- Petrol models: Clean fuel sediment bowl.
- Petrol models: Check distributor contact points. Gap .014 to .016 in. (0,30 to 0,40 mm).
- Petrol models: Lubricate and clean distributor.
- Check tappet clearance. 4-cylinder: Inlet and exhaust .010 in. (0,25 mm). 6-cylinder: Inlet .006 in. (0,15 mm). Exhaust .010 in. (0,25 mm). Engine hot.
- Diesel models: Renew fuel filter element. Both when two filters are fitted.
- Diesel models: Clean fuel sediment bowl.
- Diesel models, Forward Control: Clean sedimentor.

Diesel models: Remove injectors, check and, if necessary, adjust.

Check belt adjustment. See Part One in this book.

Lubricate dynamo.

Check water level in radiator (anti-freeze in winter), $\frac{1}{2}$ to $\frac{3}{4}$ in. (12 to 19 mm) below bottom of filler neck.

Drain and refill gearbox and transfer box.

Drain flywheel housing when drain plug is fitted for wading.

Gearbox and transfer box

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

Drain and refill gearbox and transfer box monthly when operating under severe wading conditions.

Clutch

Check fluid in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level and specific gravity of electrolyte.

Clean, grease and tighten battery terminals.

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 24,000 MILES (36,000 KM)

MAINTENANCE ATTENTION AT 24,000 MILES (36.000 KM)—continued

Axles, front and rear †	<p>Drain and refill differentials.</p> <p>Drain and refill front swivel pin housings.</p>	Propeller shafts, front and rear †	<p>*Lubricate sliding joints and journals as applicable</p>
<p>Steering box and ball joints †</p> <p><i>Check rubber boots daily when operating under arduous conditions.</i></p>	<p>Check oil level, top up if necessary to bottom of filler plug hole.</p> <p>Check that rubber boots on steering ball joints are not dislodged or damaged.</p>	<p><i>Lubricate sliding joints daily under really severe conditions or when wading.</i></p>	
<p>Brakes †</p> <p><i>Clean out brake drums weekly when wading in deep muddy conditions.</i></p>	<p>Check fluid level in reservoir, top up if necessary so that fluid is just showing in bottom of filter. Use Castrol Girling 'Crimson' Brake and Clutch Fluid (Specification SAE 70 R3).</p> <p>Check and, if necessary, adjust brake shoes.</p> <p>Check and, if necessary, adjust handbrake shoes.</p> <p>See also Road Test.</p>	Electrical †	<p>Check headlamp beam setting.</p> <p>Check lights and instruments for correct operation.</p>
<p>Wheels and tyres</p> <p><i>Check tyre pressures monthly.</i></p>	<p>Change round all road wheels.</p> <p>Check tyre pressures and inspect tyre treads.</p>	General	<p>Oil throttle linkage joints, door locks and hinges, bonnet prop rod, etc.</p>
Body and road springs †	<p>Check all body bolts for tightness.</p> <p>Check security of 'U' bolts and spring clips.</p> <p>Check propeller shaft bolts for tightness.</p>	Road test	<p>Give vehicle a thorough road test and carry out any further adjustments required, including brakes, throttle linkage, etc.</p> <p>After test, check for oil, fuel and fluid leaks at all plugs, flanges, joints and unions.</p> <p>Check brake pipes and hoses for chafing and looseness. Report any defects.</p> <p>Wipe clean all controls, handles, etc. Clean windscreen and lights.</p>

† Items marked with a dagger (†) do not require such frequent maintenance attention when the vehicle is used under stationary working conditions

CONVERSION CHART

Miles and kilometers, fuel consumption and hours' running time

Miles	Kilometers	Fuel consumption								Hours' running time
		Petrol				Diesel				
		'Regular' and 'Long'		Forward Control		'Regular' and 'Long'		Forward Control		
		Gallons	Litres	Gallons	Litres	Gallons	Litres	Gallons	Litres	
4,000	6.000	200	900	330	1.480	135	610	190	860	160
8,000	12.000	400	1.800	660	2.960	270	1.220	380	1.720	320
12,000	18.000	600	2.700	990	4.440	405	1.830	570	2.580	480
16,000	24.000	800	3.600	1,320	5.920	530	2.440	760	3.440	640
20,000	30.000	1,000	4.500	1,650	7.400	665	3.050	950	4.300	800
24,000	36.000	1,200	5.400	1,980	8.880	800	3.660	1,140	5.160	960

Capacities

Component	Imperial unit	US unit	Litres
Engine sump oil, 4-cylinder	11 pints	13 pints	6,0
Engine sump oil, 6-cylinder	10 pints	12 pints	5,75
Extra when refilling after fitting new filter, 4-cylinder	1½ pints	1.8 pints	0,85
Extra when refilling after fitting new filter, 6-cylinder	1 pint	1.2 pints	0,5
Air cleaner oil, 4-cylinder	1½ pints	1.8 pints	0,85
Air cleaner oil, 6-cylinder	1 pint	1.2 pints	0,5
Main gearbox oil	2½ pints	3 pints	1,5
Transfer box oil	4½ pints	5½ pints	2,5
Rear differential } Standard and limited	3 pints	3½ pints	1,75
Front differential } slip type	3 pints	3½ pints	1,75
Rear differential } ENV	2½ pints	2½ pints	1,2
Front differential } type	2½ pints	3.1 pints	1,4
Swivel pin housing oil (each)	1 pint	1.2 pints	0,5
Fuel tank, except 'Long' Station Wagon and Forward Control	10 gallons	12 gallons	45
Fuel tank, 'Long' Station Wagon and Forward Control	16 gallons	19 gallons	73
Cooling system, 4-cylinder Petrol models, except Forward Control	18 pints	21½ pints	10,25
Cooling system, 4-cylinder Petrol Forward Control models	19 pints	22¾ pints	10,8
Cooling system, 6-cylinder Petrol Forward Control models	23 pints	27¾ pints	13,0
Cooling system, 6-cylinder 'Long' models	20 pints	24 pints	11,2
Cooling system, Diesel models 'Regular' and 'Long'	17½ pints	21 pints	10,0
Cooling system, Diesel models Forward Control	18 pints	21½ pints	10,5
Hydraulic front winch, supply tank	4½ gallons	7½ gallons	20,0
Hydraulic front winch, gearbox	2 pints	2.4 pints	1,0

Recommended lubricants and fluids

These recommendations apply to temperate climates where operational temperatures may vary between approximately 10°F (-12°C) and 90°F (32°C).

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

Information on oil recommendations for use under extreme winter or tropical conditions can be obtained from your local Rover Distributor or Dealer or The Rover Co. Ltd., Technical Service Department

COMPONENTS	SAE	BP	CASTROL	DUCKHAM'S	ESSO	MOBIL	REGENT TEXACO- CALTEX	SHELL
Petrol models Engine, air cleaner and governor	20W	*BP Super Visco-Static 10W-40	*Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Arctic	Havoline 20/20W	*Shell Super Oil
Diesel models Engine and air cleaner	20W	BP Energol Diesel D20W	Castrol CRI20	NOL Diesel Engine Oil 20	Essofleet HD20	Mobiloil Arctic	RPM Delo Special 20	Rotella 20/20W
Gearbox and transfer box *Differentials and swivel pin housings Steering box Steering relay unit Rear power take-off, pulley unit and capstan winch hydraulic winch gearbox	90EP	BP Energol SAE 90EP	Castrol Hypoy	Duckham's Hypoid 90	Esso Gear Oil GP 90/140	Mobilube GX 90	Multigear Lubricant 90	Spirax 90 EP
Hydraulic winch supply tank	—	*BP Super Visco-Static 10W-40	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Esso Motor Oil 20W/30	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energol L2	Castrol LM	Duckham's LB10 Grease	Esso Multi- purpose Grease H	Mobilgrease MP or Mobil- grease Special	Marfak Multi- purpose 2	Retinax A
Brake and clutch fluid	Girling 'Crimson' Brake and Clutch Fluid Specification SAE 70 R3							
Anti-freeze solution	Any anti-freeze solution conforming to British Standard No. BS 3152							

*Rear differential, limited-slip type: Castrol 90EP-LS, Fina Pontonic Plus, Shell Limited-Slip Differential Oil S6721A or Mobilube 46—available in the UK market.

Pure Oil TSS90, Texaco 3450 or Mobil 46—available in the North America dollar area.

Tyre Pressures

		Normal				Emergency soft			
		Load under 550 lb (250 kg)		Load over 550 lb (250 kg)		Load under 550 lb (250 kg)		Load over 550 lb (250 kg)	
		Front	Rear	Front	Rear	Front	Rear	Front	Rear
88 models									
Avon or Dunlop 6.00 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Avon or Dunlop 7.00 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Avon or Dunlop 7.50 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	30 2,1	12 0,8	12 0,8	12 0,8	20 1,4
Michelin XS 7.50 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	30 2,1	12 0,8	12 0,8	12 0,8	20 1,4
109 models except Forward Control									
Avon or Dunlop 7.50 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	36 2,5	15 1,0	15 1,0	15 1,0	26 1,75
Michelin XS 7.50 x 16.00	lb/sq. in. kg/cm ²	25 1,7	25 1,7	25 1,7	36 2,5	15 1,0	15 1,0	15 1,0	26 1,75
110 Forward Control models									
Avon or Dunlop 9.00 x 16.00	lb/sq. in. kg/cm ²	28 2,0	18 1,3	35 2,4	30 2,1	12 0,8	12 0,8	12 0,8	15 1,0

Pressures should be checked and adjusted monthly, paying attention to the following points:

1. Whenever possible, check with the tyres cold, as the pressure is about 2 lb/sq. in. (0,1 kg/cm²) higher at running temperature.
2. Always replace the valve caps, as they form a positive seal on the valves.
3. Any unusual pressure loss (in excess of 1 to 3 lb/sq. in. (0,05 to 0,20 kg/cm²) per month) should be investigated and corrected.
4. Always check the spare wheel, so that it is ready for use at any time.

By Appointment to
Her Majesty
Queen Elizabeth II



Manufacturers
of Motor Cars
and Land-Rovers

The Rover Company Limited