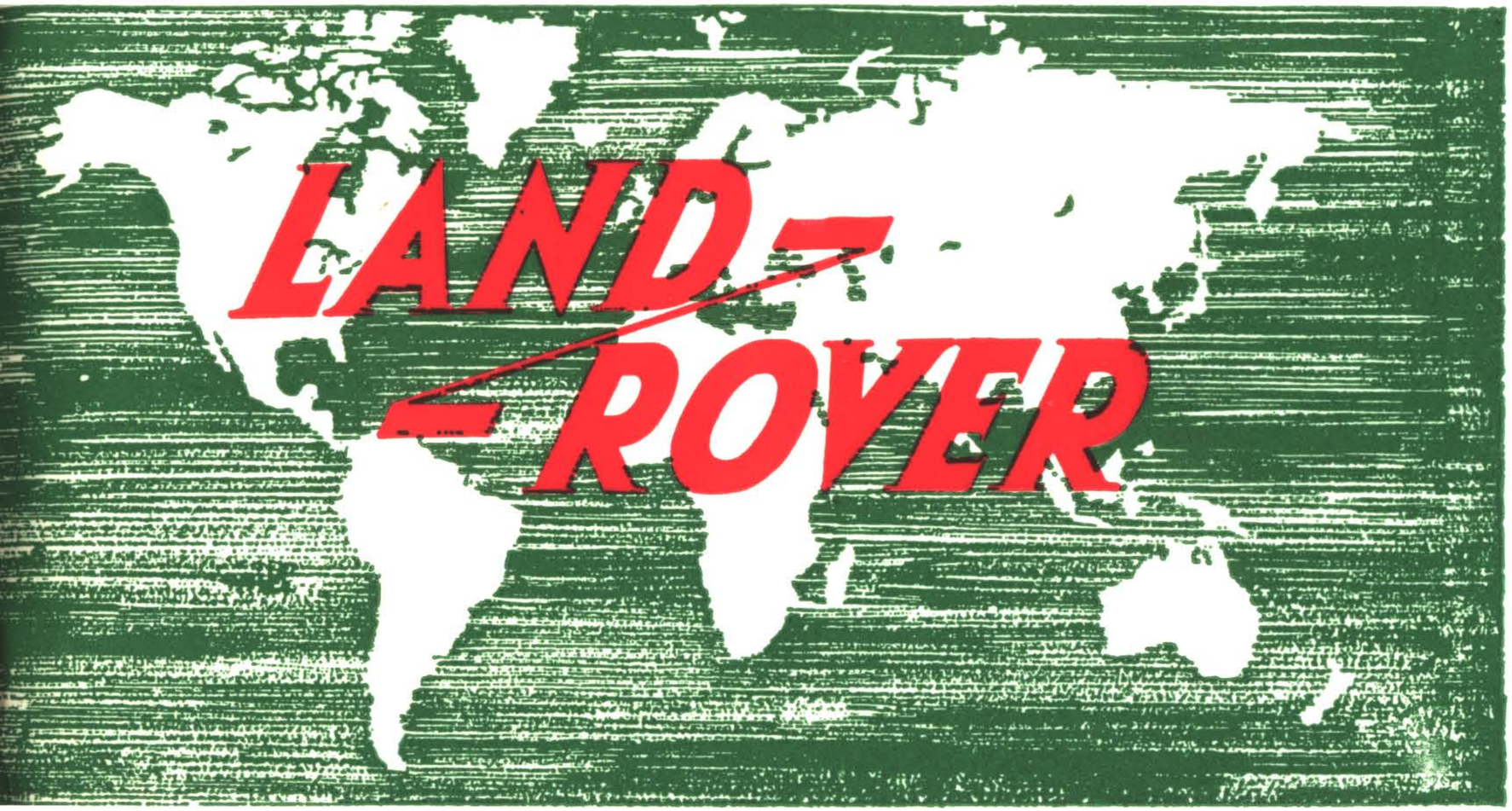


Owner's Maintenance Manual

Part No. 4852

PDF by roby65to

LAND-ROVER

Owner's Maintenance Manual

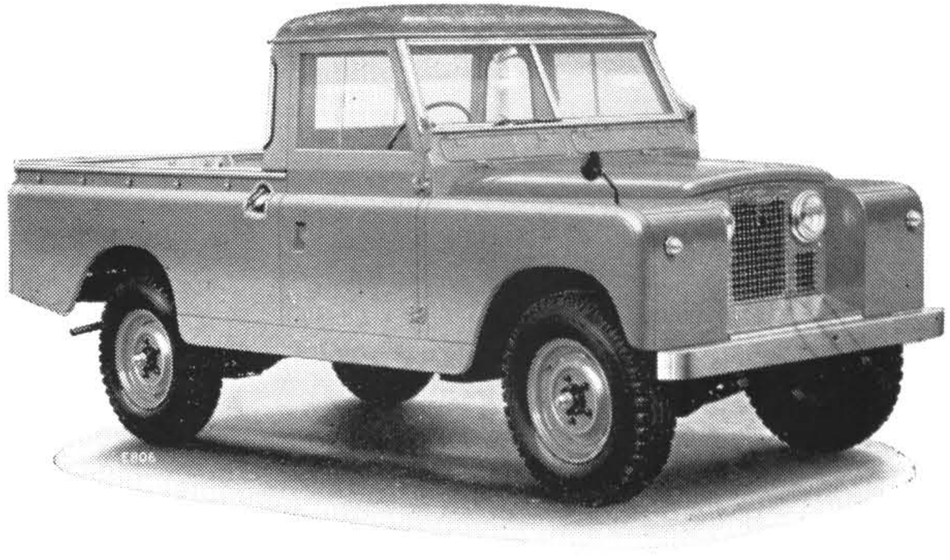
Incorporating Free Service and Maintenance Schedules

COVERING SERIES IIA REGULAR AND LONG
SERIES IIB FORWARD CONTROL
PETROL AND DIESEL MODELS
NEGATIVE EARTH ELECTRICAL SYSTEM

THE ROVER CO. LTD
SOLIHULL
WARWICKSHIRE
ENGLAND

Part No. 4852

Series IIA 88 'Regular'



Series IIA 109 'Long'

Series IIA 109 Station Wagon

Series IIB 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 or vehicle 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 (8.000 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 Oil	*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 CR20	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 Oil	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Teresso 43 or Essofleet HD 10W	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energrease L 2	Castrolease 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	Girling 'Crimson' Brake and Clutch Fluid. Specification SAE 70 R3							
Anti-freeze solution	Any good quality glycol-base solution							

***Rear differential, limited slip type:** 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

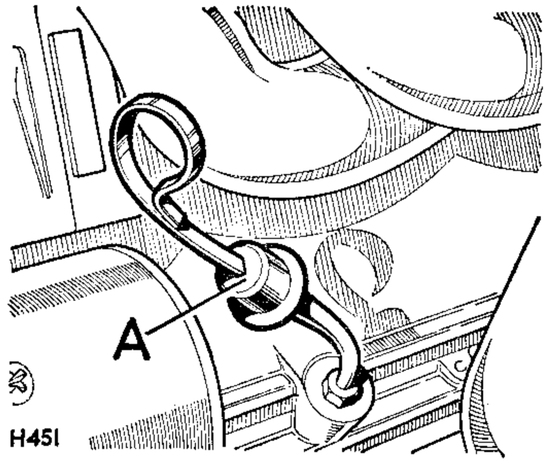
Proceed as follows:

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 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.

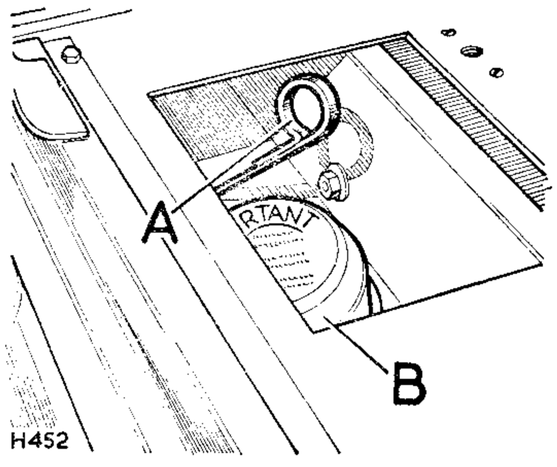
However, when the Land-Rover is being used at steep angles, the oil should not be allowed to fall below the intermediate mark 'II', that is, the low level. This will obviate any danger of oil pump starvation when the vehicle is facing downhill at a steep angle.

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

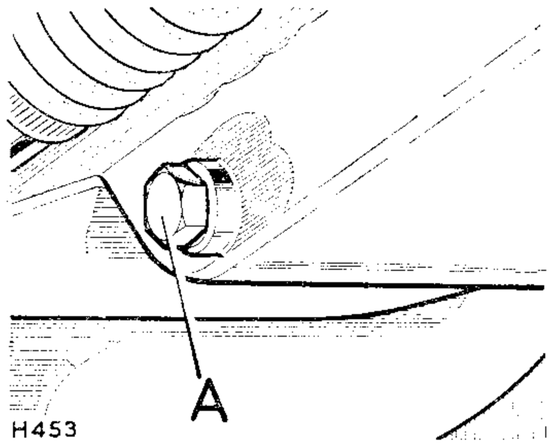
A—Dipstick at left-hand side of engine



Engine oil level dipstick and oil filler, 6-cylinder models

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

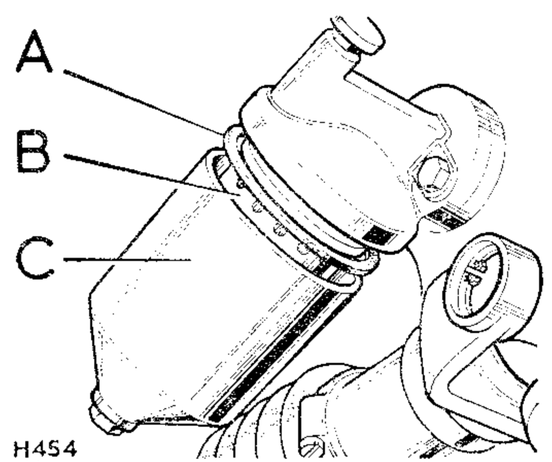
Engine oil changes and filter replacement. Oil changes—every 4,000 miles (6.000 km) or every four months, whichever comes first; filter replacement—every 8,000 miles (12.000 km). All models

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.



Engine oil filter, 4-cylinder models

A—Rubber washer, large

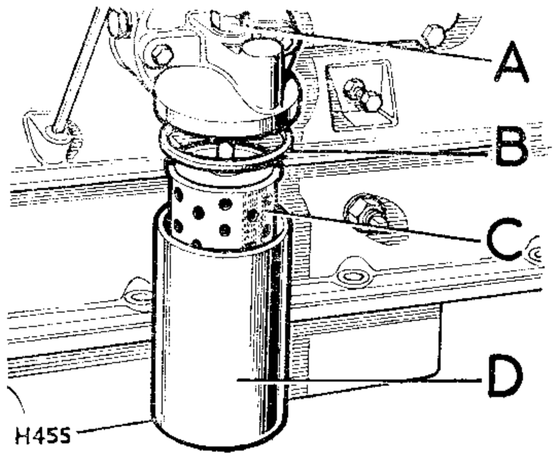
B—Oil filter element

C—Container for oil filter

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.

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

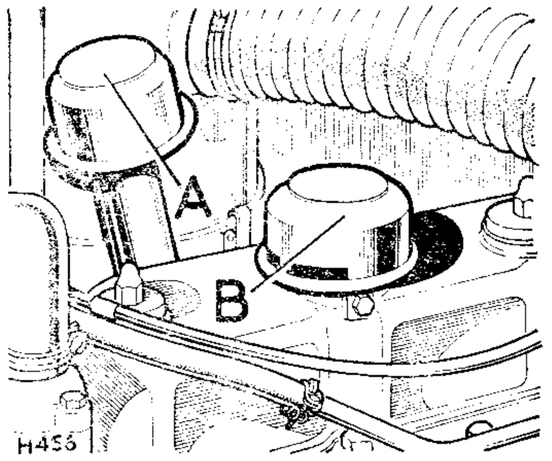
C—Element for filter

D—Container for filter

Engine breather filters—Every 8,000 miles (12.000 km). All models

Clean as follows:

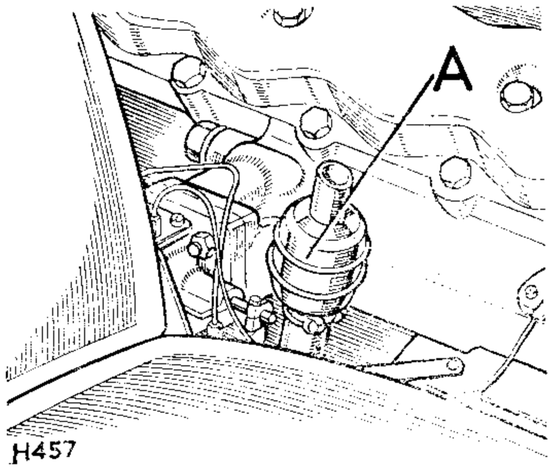
Remove the filters and wash the gauze thoroughly by swilling the units in petrol. Re-wet the gauzes by dipping in clean engine oil and shake off the surplus; replace the engine breather filter with the slot facing forward and the oil filler filter with the slot facing the rear of the vehicle. On Forward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



Engine breather filters

A—Oil filler filter

B—Engine breather filter



Crankcase breather filter, 6-cylinder models

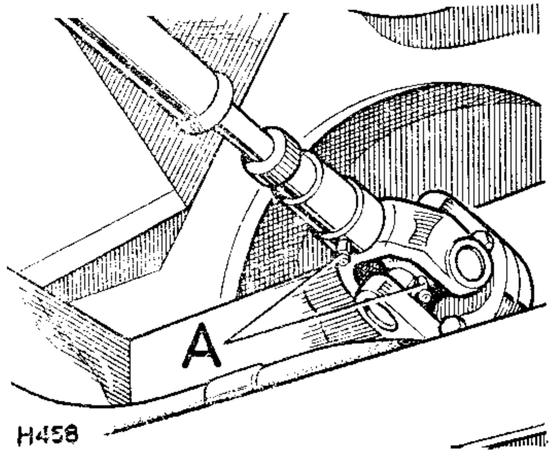
A—Breather filter

Crankcase breather filter, 6-cylinder models (except America dollar area 109 Station Wagon)—Every 8,000 miles (12.000 km).

Clean as follows:

Remove the engine cover panel, slacken the hose clip and withdraw the filter. Wash the gauze thoroughly by swilling the unit in petrol and re-wet the gauze by dipping in clean engine oil. Shake off the surplus and refit to breather pipe.

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



Fan drive shaft, Forward Control models

A—Grease nipples

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.

Air cleaner All models (except North America dollar area 109 Station Wagon)—Every 4,000 miles (6.000 km).

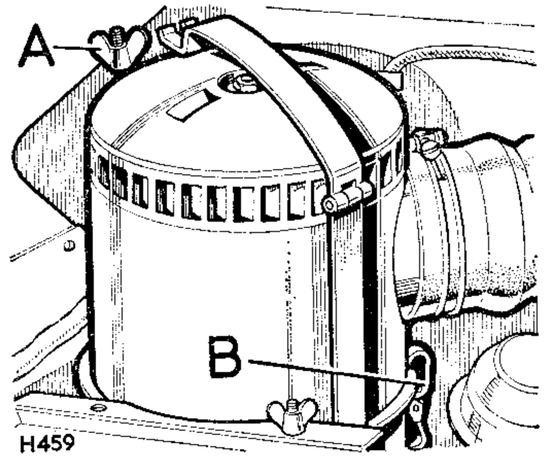
Attention to the air cleaner is extremely important, especially under dusty conditions, as engine wear generally will be seriously affected if the vehicle is run with an excessive amount of sludge in the cleaner oil bath.

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:

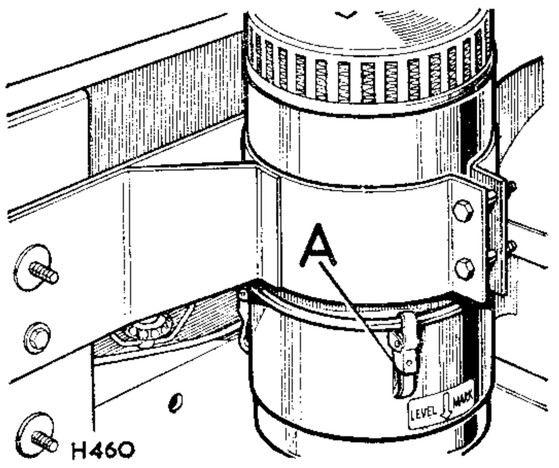
1. Release the clamping strap securing the complete air cleaner. Disconnect the outlet elbow from the carburetter intake pipe and remove the cleaner from the vehicle.
2. Remove the oil bowl from the bottom of the cleaner by releasing the three securing clips.
3. Clean all dirty oil and sludge from the bowl and refill with fresh engine oil to the level indicated by a ring formed in the pressing; the capacity is approximately 1½ 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, 'Regular' models illustrated

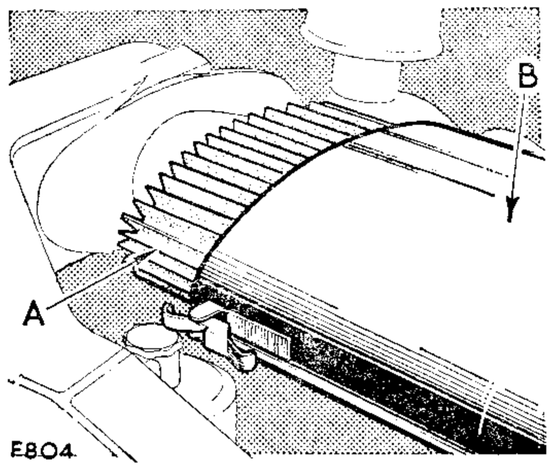
A—Wing nut for clamping strap

B—Securing clip



Air cleaner, Forward Control 6-cylinder models

A—Securing clip



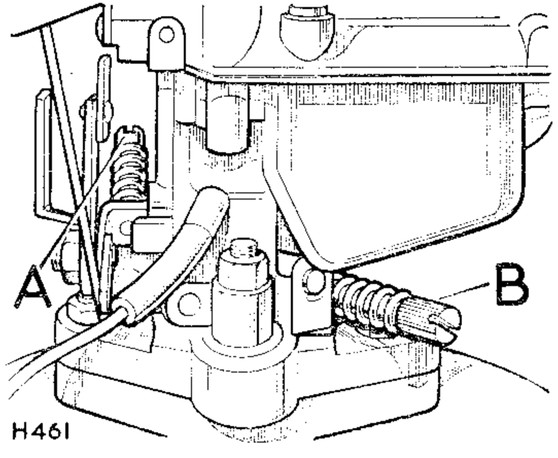
Air cleaner (North America dollar area 109 Station Wagon)
A—Element
B—Container for element

Air cleaner (North America dollar area 109 Station Wagon)—Every 12,000 miles (18.000 km)

Attention to the air cleaner is extremely important. Replace element more frequently under dusty conditions, as performance will be seriously affected if the vehicle is run with an excessive amount of dust in the element.

Proceed as follows:

1. Remove bolts securing the air cleaner and lift out the complete unit.
2. Unclip end cover and withdraw element complete with frame.
3. Release wing nut on frame and remove end cap and sealing washer.
4. Discard old element and replace with new unit.
5. Ensure that the sealing washers are in position and intact, and reassemble the unit. Refit to engine.



Carburetter slow-running adjustment 4-cylinder Petrol models
A—Throttle stop screw
B—Volume control screw

Carburetter slow-running adjustment—Every 4,000 miles (6.000 km). 4-cylinder Petrol models

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

Should the carburetter 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.

Carburetter slow-running adjustment—Every 4,000 miles (6.000 km). 6-cylinder Petrol models

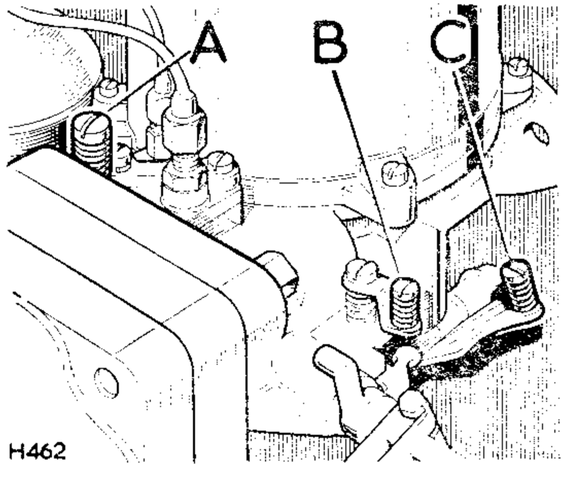
1. Run the engine until normal operating temperature is obtained. If necessary adjust slow-run valve to give the correct idling speed.
2. Lift the carburetter piston approximately $\frac{1}{32}$ in. (1 mm) by means of the lift pin situated on the right of the carburetter body. There is approximately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

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.

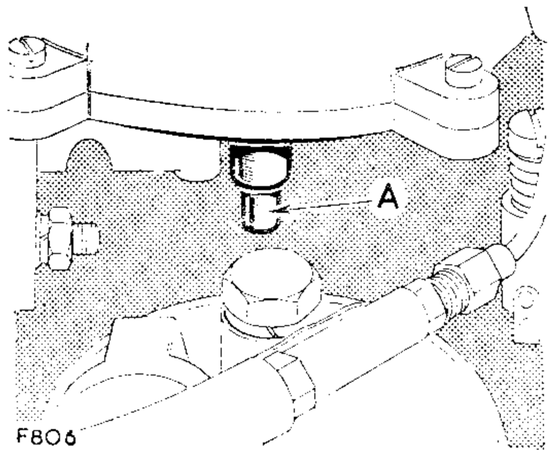
Finally adjust the slow-run valve to get a smooth idling speed.

The fast idle screw should not require adjustment.



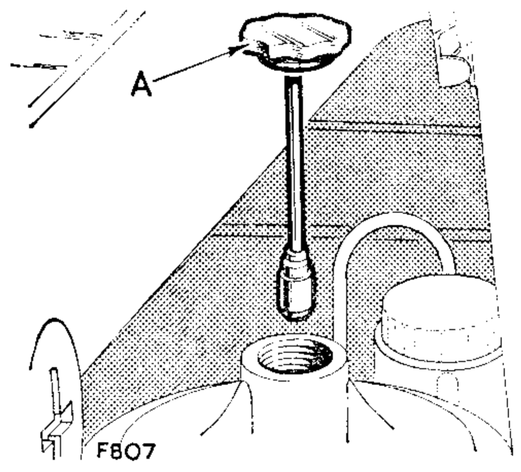
Carburetter slow-running adjustment, 6-cylinder Petrol models

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



Carburetter lift-pin, 6-cylinder Petrol models

A—Lift-pin

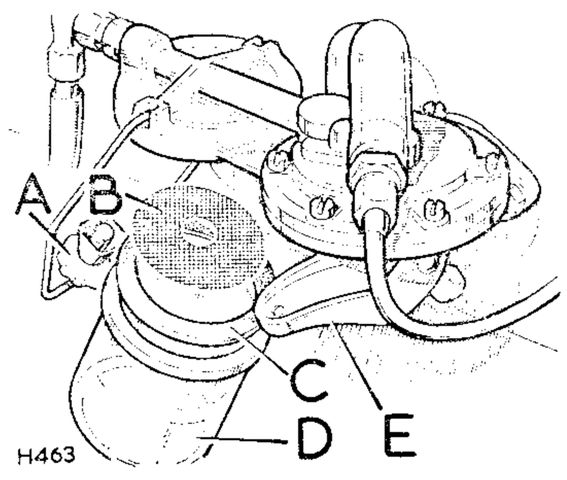


Carburetter hydraulic damper, 6-cylinder Petrol models

A—Cap and hydraulic damper

Carburetter 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 pump sediment bowl provides an additional filter between pump and carburetter.

It is located:

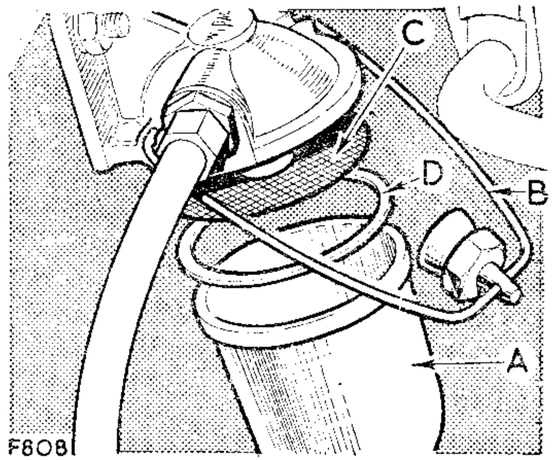
4-cylinder models, on the right-hand side of the engine.

6-cylinder 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

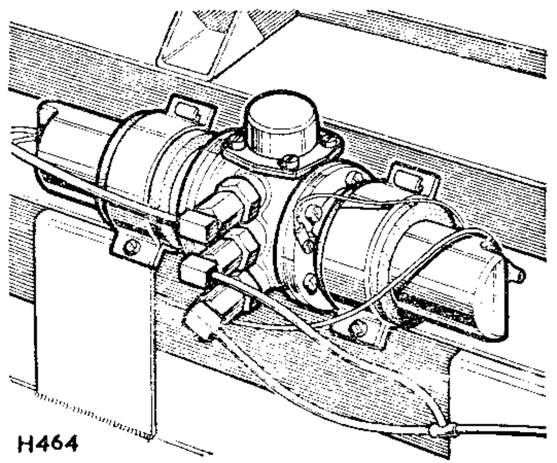
A dual fuel pump is fitted on the inside of the right-hand sub-frame side member.

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

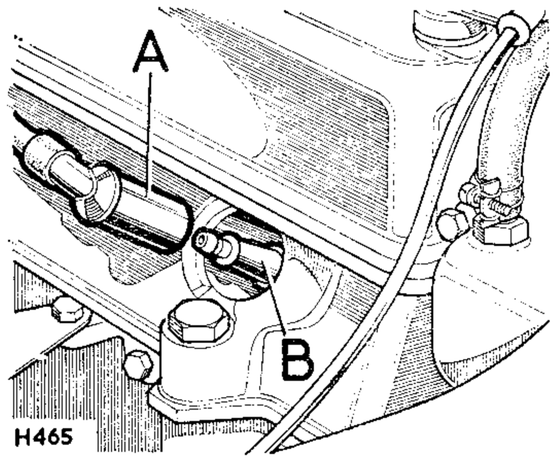
With twin tank installations the pump connections are such that the primary and secondary pumps draw on the main and additional fuel tank respectively.

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, except America dollar area 109 Station Wagon, use Champion N5.

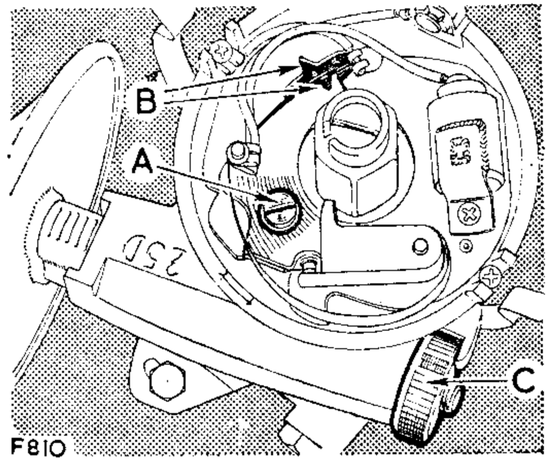
6-cylinder models, America dollar area models, use Champion N4.

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.

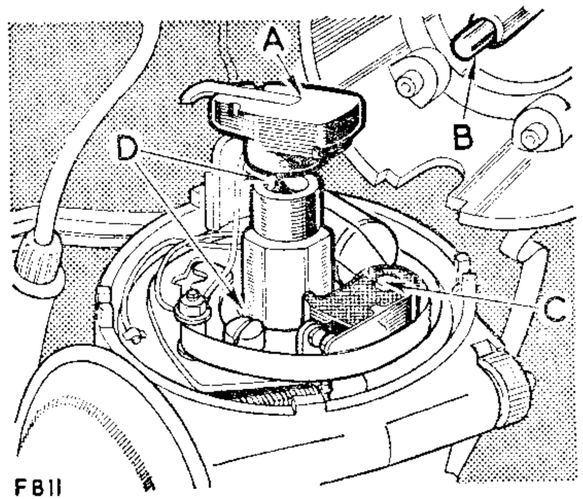


Distributor contact points

A—Securing screw for adjustable contact

B—Adjuster slot for contact points

C—Adjuster screw, ignition timing



Distributor

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

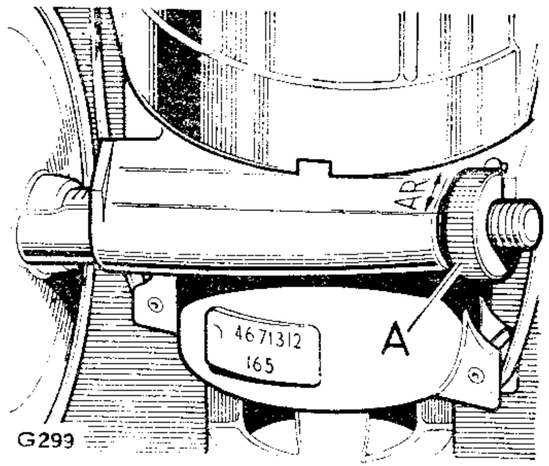
Distributor maintenance—Every 4,000 miles (6.000 km). Petrol models

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.
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.



Ignition timing

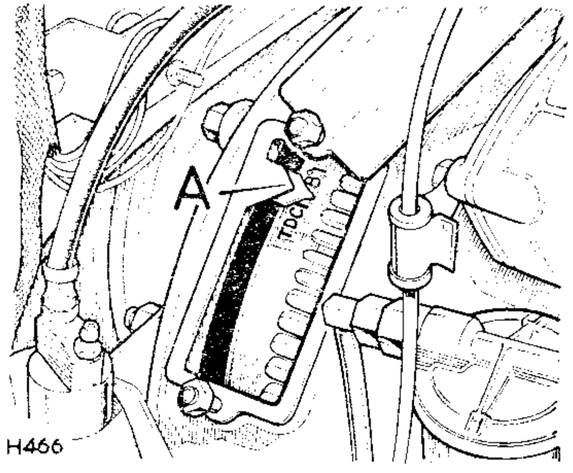
A—Adjuster screw, ignition timing

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.

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.



Flywheel markings

A—Timing pointer

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.

   2° mark—6-cylinder models when using Regular fuel.
   3° mark—4-cylinder models when using Regular fuel.
   6° mark—4 and 6-cylinder models when using Premium 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.

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.

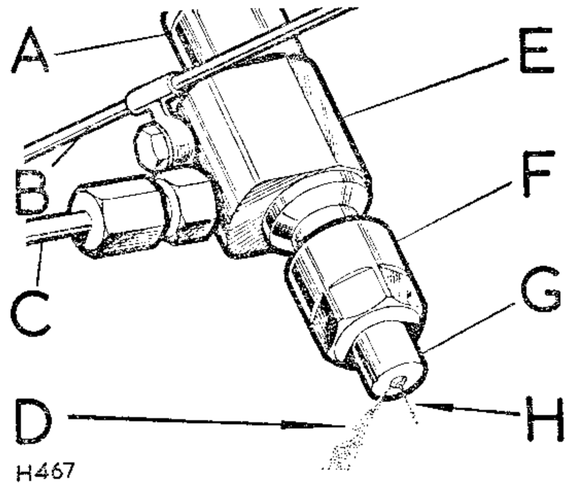
The injectors are located in the top of the cylinder head on the right-hand side. Injectors may be removed for checking and adjustment as follows:

(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.

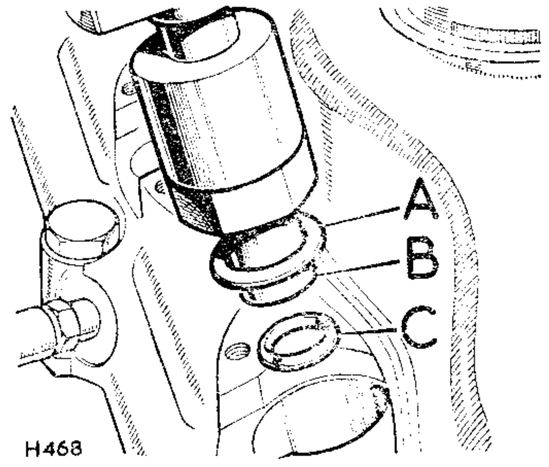
(c) Lift out the injectors, complete with spill pipe and copper washers. Remove the steel washers from inside the injector holes.

(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.



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



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

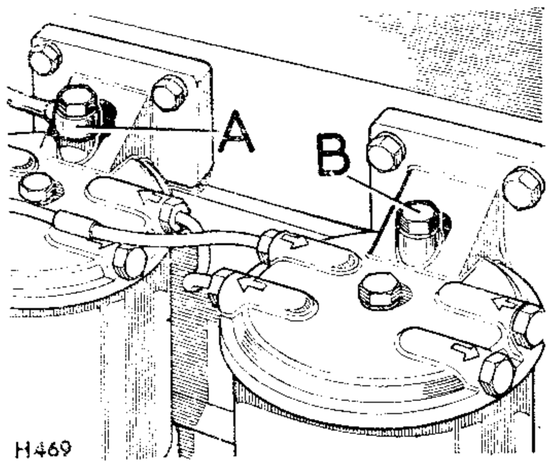
The use of a test pump is essential when adjusting injectors; we strongly recommend therefore, that adjustment required on injectors be carried out by your nearest Rover Distributor or Dealer or CAV Agent.

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.



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

A—Bleed pipe
B—Air vent screw

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.

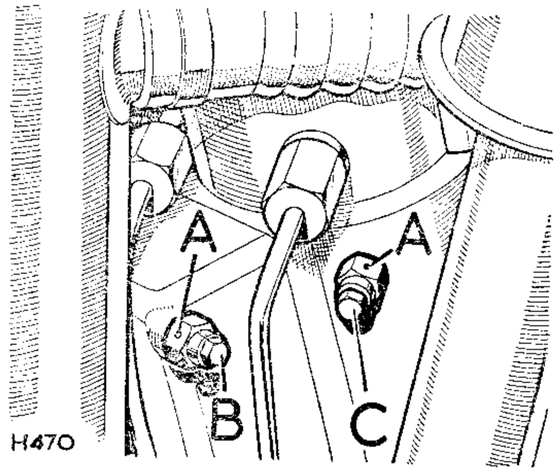
4. Tighten the bleed pipe or air vent screw.
5. Operate the hand priming lever once or twice to clear the last bubbles of air into the filter bleed pipe.
6. Start engine in normal way and check for leaks.

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.

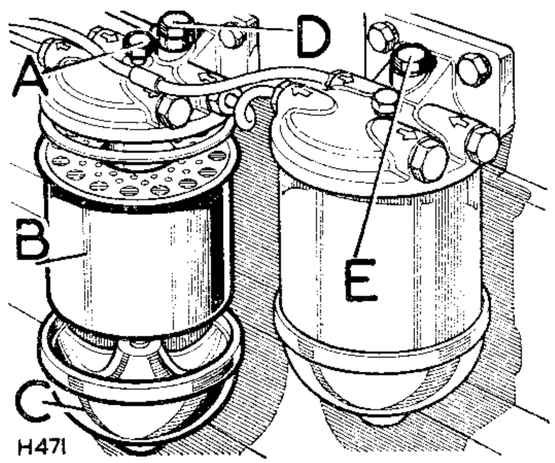


Priming the distributor pump, Diesel models

A—Fuel orifice

B—Air vent screw on distributor

C—Air vent screw on distributor control cover



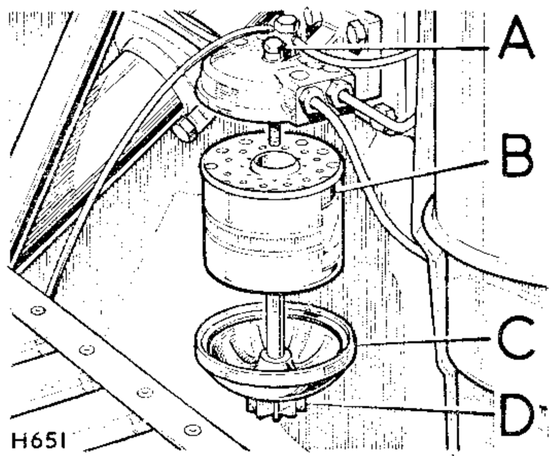
Paper element filter, 'Regular' and 'Long' Diesel models. Twin filter system illustrated. Filters on dash

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

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, Forward Control Diesel models. Filter at rear engine

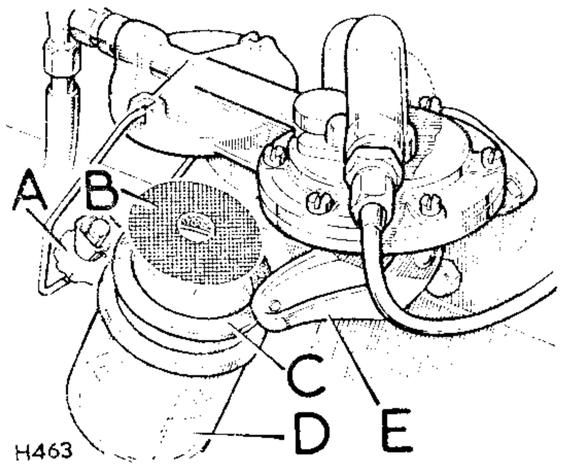
A—Element retaining bolt
B—Element
C—Element holder
D—Water drain plug

Fuel pump and 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.

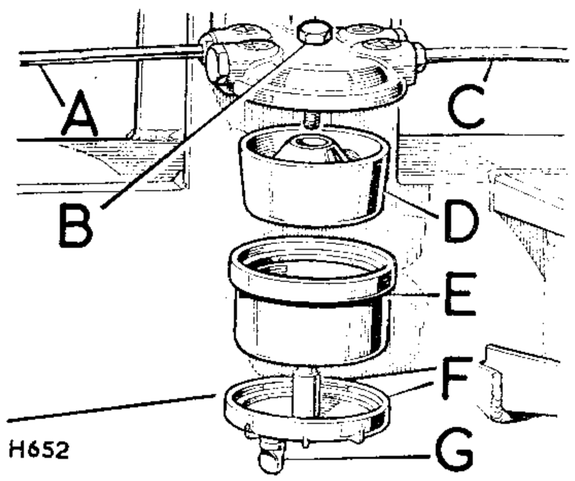
Clean as follows:

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 pump and sediment bowl, 'Regular' and 'Long' Diesel models

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



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

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.

Distributor pump, Diesel models

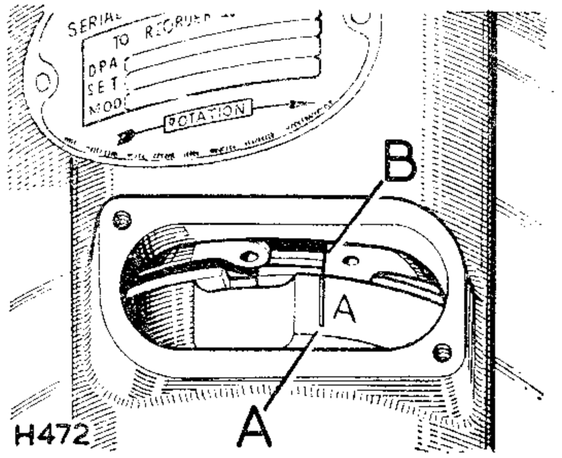
This unit is correctly set on leaving the factory and requires no further adjustment. It is lubricated by the diesel fuel and does not require any maintenance in this respect.

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.



Injection pump timing marks correctly aligned

A—Timing mark

B—Straight edge of timing circlip

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.

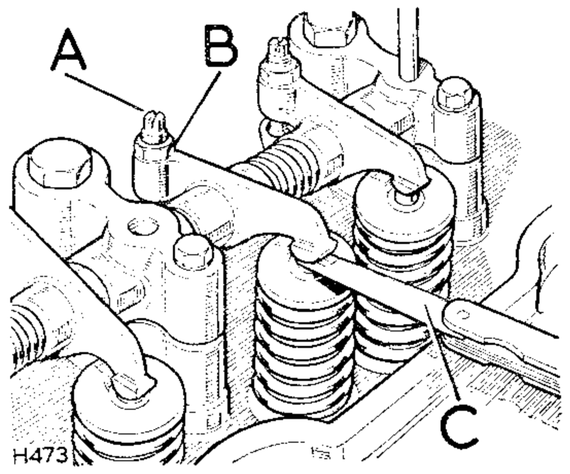
If the flywheel is inadvertently turned too far and the timing mark on the pump drive plate goes past the appropriate timing point on the circlip, the operation must be repeated.

Tappet adjustment—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.

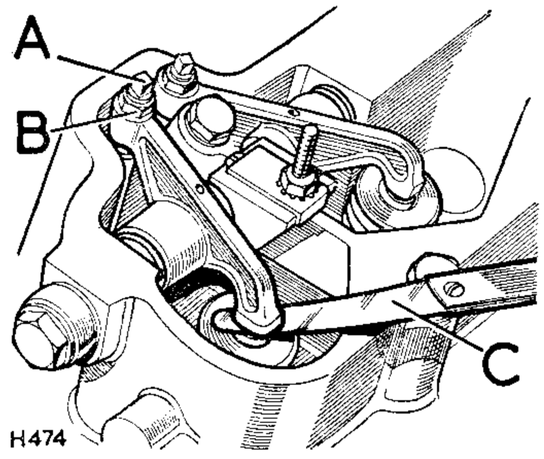
To carry out tappet adjustment, proceed as follows:

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.



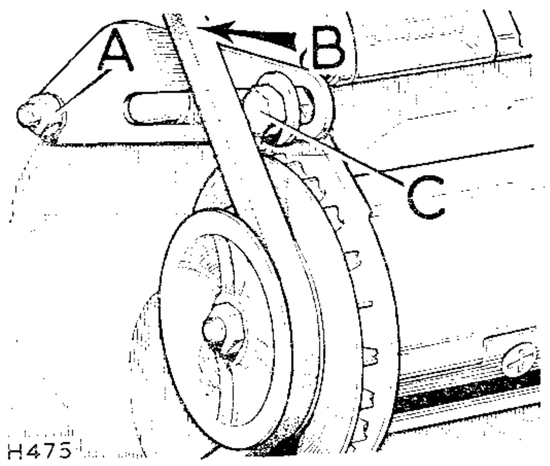
Tappet adjustment, 4-cylinder models

A—Adjusting screw
B—Locknut
C—Feeler gauge



Tappet adjustment, 6-cylinder models

A—Adjusting screw
B—Locknut
C—Feeler gauge



Fan belt adjustment, 'Regular' and 'Long' models

A—Adjusting bolt

B—Pivot

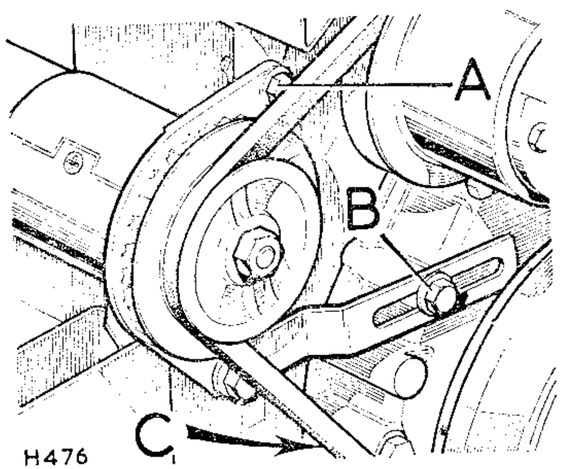
C—Check at this point, $\frac{5}{16}$ to $\frac{7}{16}$ in. (8 to 11 mm) movement

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.



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, 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.

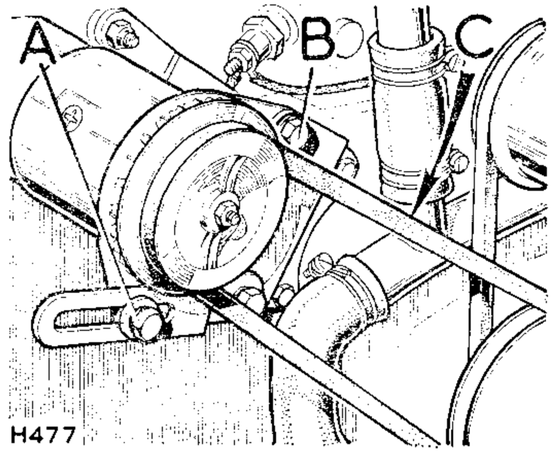
Fan belt; jockey and crankshaft pulleys.

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).

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.



Dynamo belt adjustment, Forward Control Diesel models

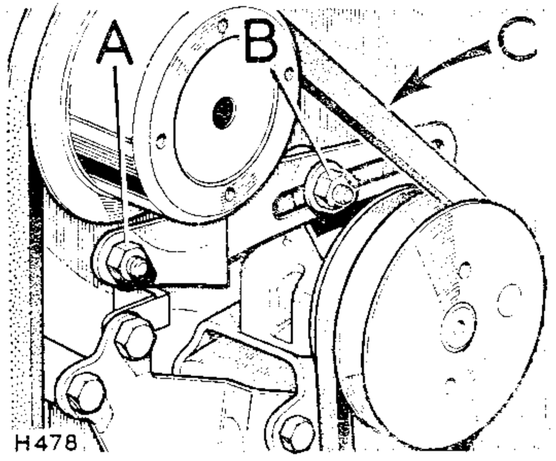
A—Adjuster bolt

B—Pivot bolt

C—Check at this point, $\frac{5}{16}$ 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.

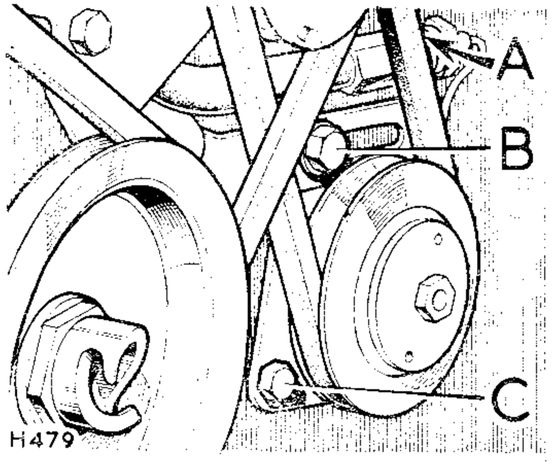


Fan belt adjustment, Forward Control Diesel models

A—Pivot bolt

B—Aduster bolt

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



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

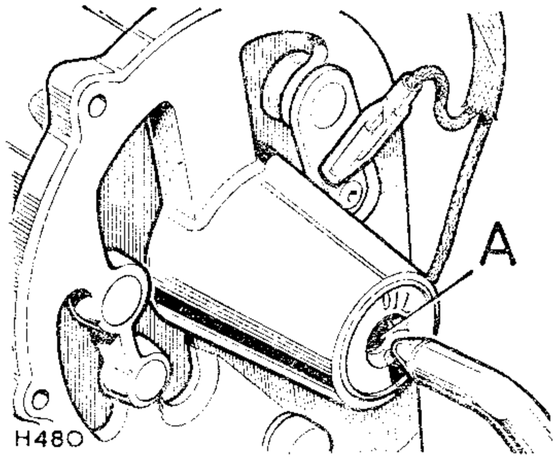
B—Adjuster bolt

C—Pivot bolt

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.



Dynamo lubrication

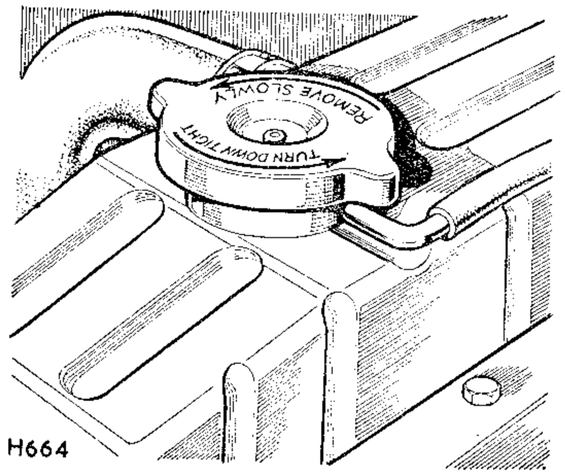
A—Oil hole

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.

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

The radiator filler cap is under the bonnet panel.



Radiator filler cap

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

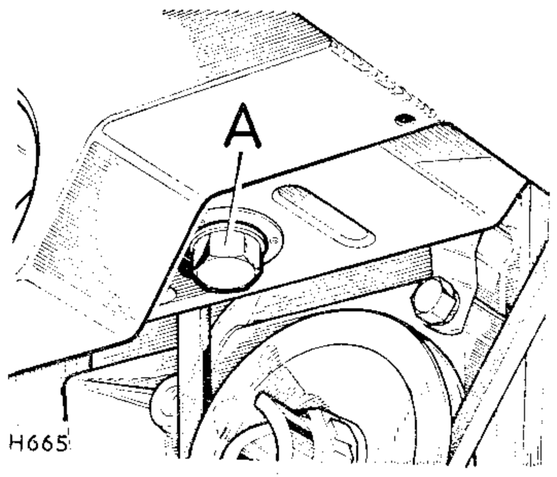
The cooling system is pressurised and care must be taken when removing the radiator filler cap, especially when the engine is hot.

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.

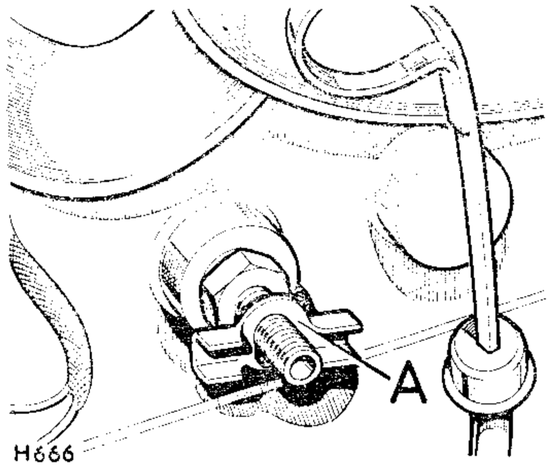
With a cold engine the correct water level is $\frac{1}{2}$ to $\frac{3}{4}$ in. (12 to 19 mm) below the bottom of the filler neck. For capacities see Data Section.

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



Radiator drain plug

A—Drain plug, at right-hand side



Cylinder block drain tap

A—Drain tap, right-hand side of engine adjacent to engine breather

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 high quality inhibited glycol-base solutions should 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.

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)

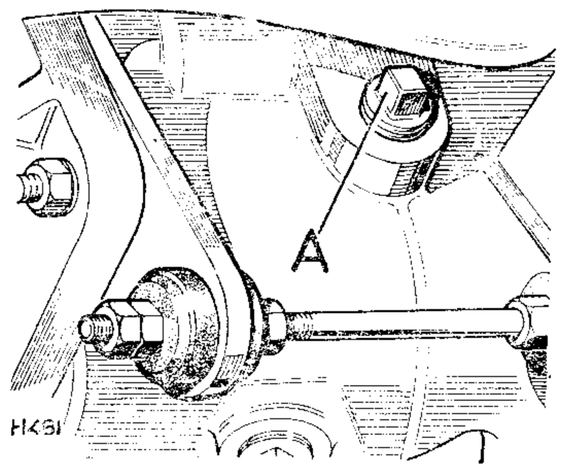
Check oil level daily or weekly when operating under severe stationary working conditions.

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.



Gearbox oil filler-level plug

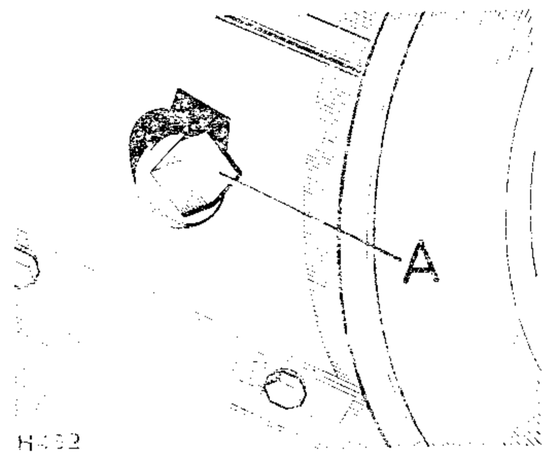
A—Oil filler-level plug

Transfer box oil level—Every 4,000 miles (6.000 km)

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

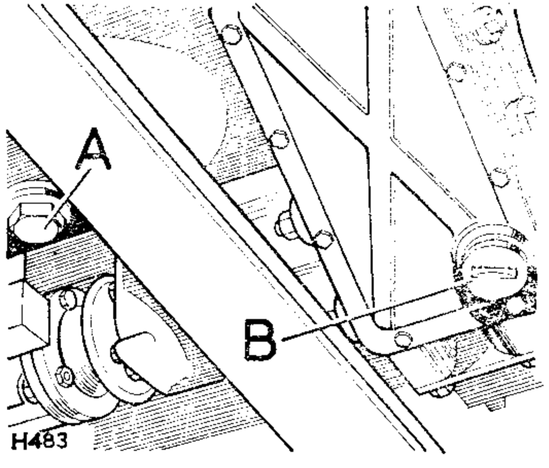
The transfer box and front wheel drive housing are lubricated as one unit. Check oil level and top up if necessary to the bottom of the filler-level plug hole. The filler-level plug is in the rear face of the transfer box, it is accessible when the seat box centre panel is removed.

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.



Transfer box oil level

A—Filler-level plug



Gearbox and transfer box drain plug

A—Gearbox drain plug

B—Transfer box drain plug

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: 2½ 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.

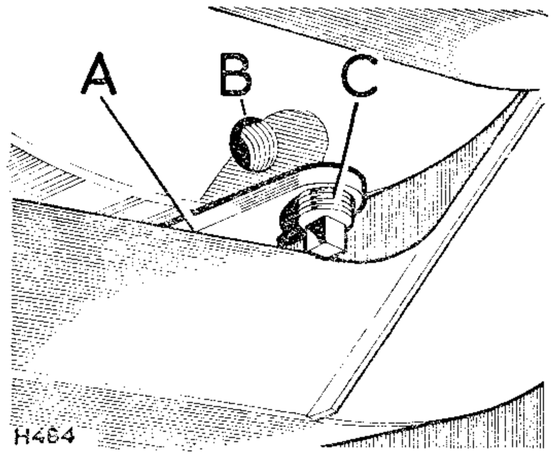
The capacity is 4½ Imperial pints (5½ US pints, 2,5 litres).

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.



Flywheel housing drain plug

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

Clutch mechanism

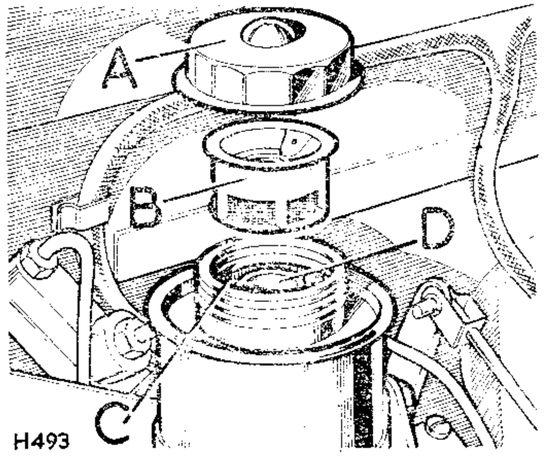
Land-Rover models are fitted with a hydrostatic clutch, that is a clutch mechanism which is correctly set on initial assembly to give approximately $\frac{5}{16}$ in. (8 mm) free movement at the pedal pad, and which requires no adjustment throughout the life of the clutch plate.

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.

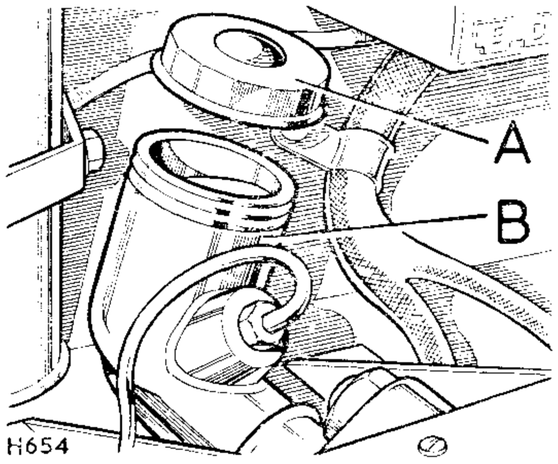
On Forward Control models there is a separate clutch fluid reservoir integral with the clutch master cylinder.

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



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

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



Clutch reservoir, Forward Control models

A—Filler cap

B—Clutch reservoir and master cylinder

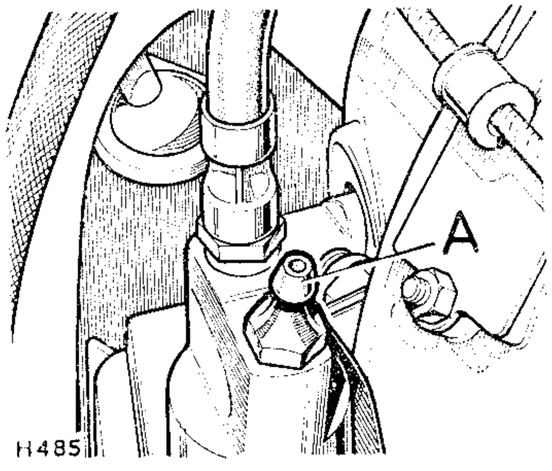
Forward Control models. Check fluid level in reservoir, top up if necessary to bottom of filler neck.

Use 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.



Bleed nipple for clutch slave cylinder

A—Bleed nipple

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—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.

Battery acid level—Every month and at every maintenance attention

Check weekly when operating under severe conditions.

The battery is located: 'Regular' and 'Long' Petrol models—under bonnet at right-hand side; 'Regular' and 'Long' Diesel models—one under bonnet at right-hand side, the other under the left-hand seat; all Forward Control models—below body, left-hand side of vehicle to rear of cab; America dollar area 109 Station Wagon—under driver's seat.

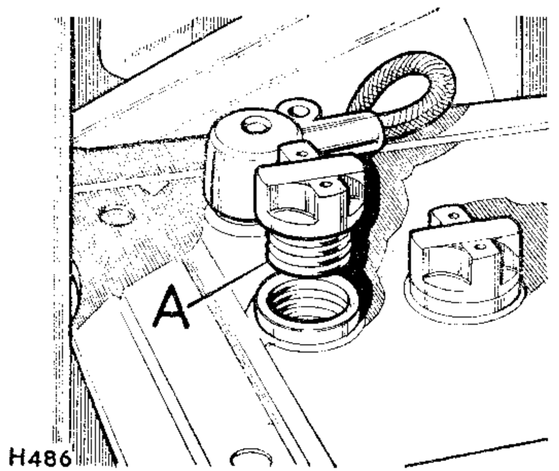
Check acid level as follows:

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.

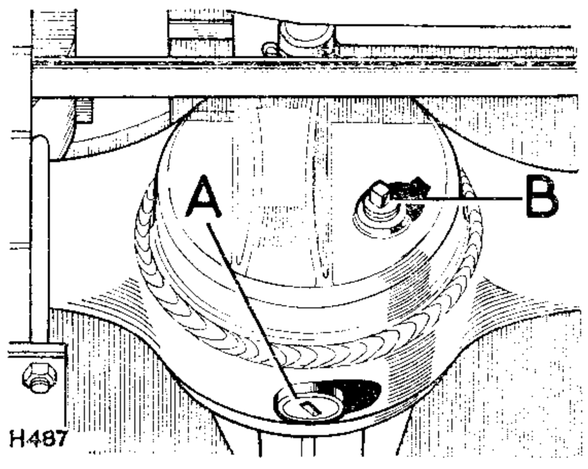
In very cold weather it is essential that the vehicle is used immediately after topping up, to ensure that the distilled water is thoroughly mixed with the electrolyte. Neglect of this precaution may result in the distilled water freezing and causing damage to the battery.



Battery acid level
A—Filler plug

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 differential oil filler-level plug

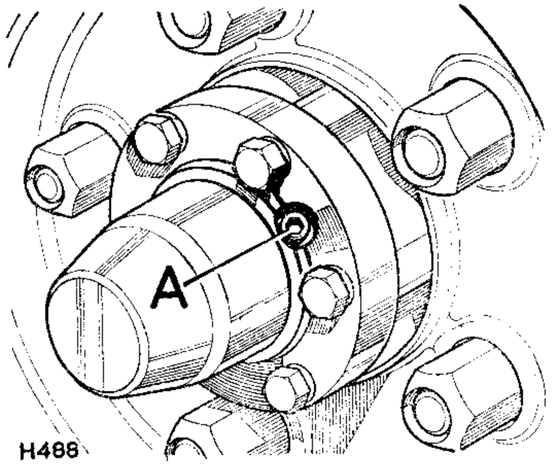
A—Filler-level plug
B—Drain plug

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.

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.



Oil filler plug, rear axle hub

A—Oil filler plug

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.

Front and rear differential oil changes—Every 12,000 miles (18.000 km)

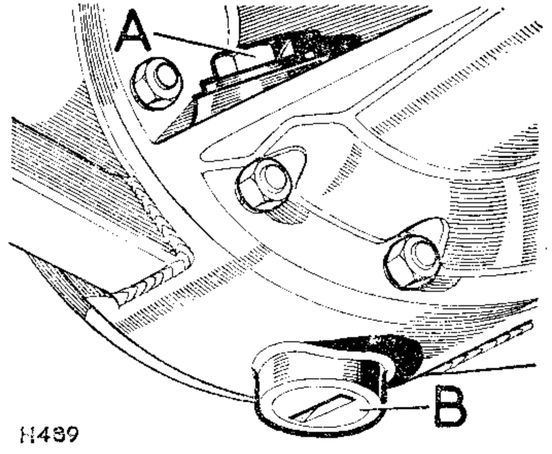
To change the differential oil, proceed as follows:

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:

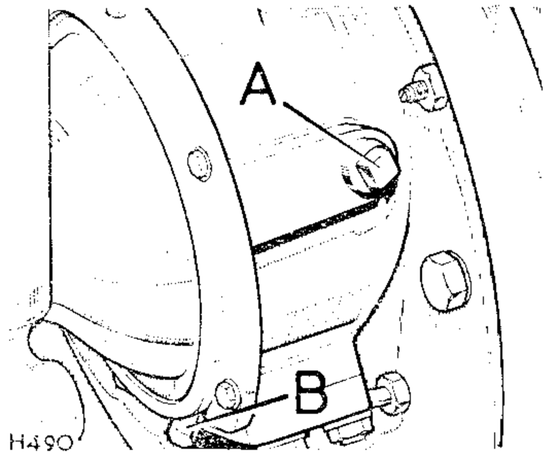
'Regular' and 'Long' models
Front and rear differential—3 Imperial pints (3½ US pints, 1,75 litres)

Forward Control models
Front differential—2⅛ Imperial pints (2½ US pints, 1,2 litres);
Rear differential—2⅝ 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.



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



Swivel pin housing oil filler-level plug

A—Oil filler-level plug
B—Drain plug

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.

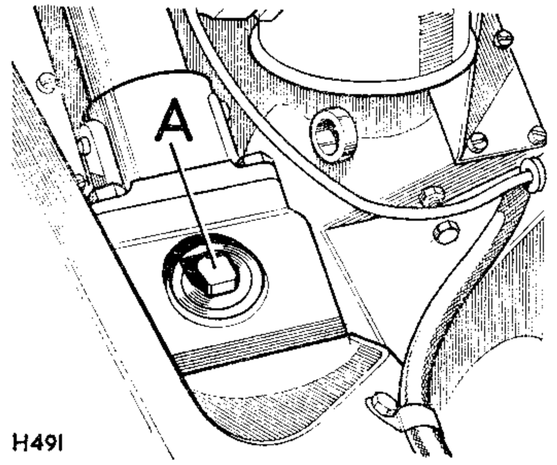
Swivel pin housing oil changes—Every 12,000 miles (18.000 km)

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).

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 box oil filler plug

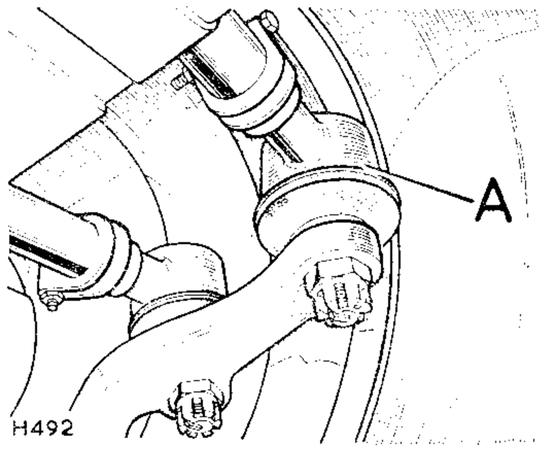
A—Oil filler plug

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

Brake system

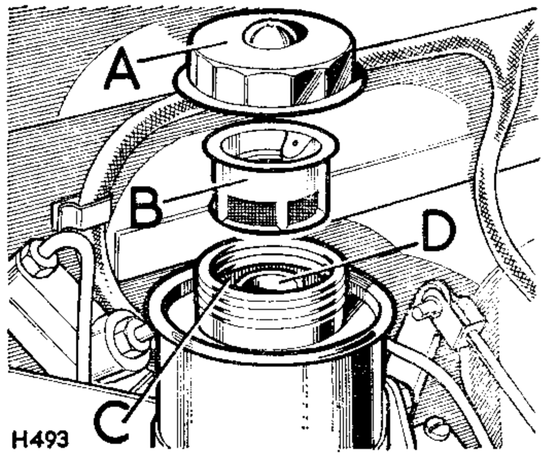
The wheel brakes, operated by a pendant foot pedal, are of the hydraulic type with servo assistance on Forward Control and America dollar area 109 Station Wagon models. The handbrake operates a mechanical brake unit mounted on the output shaft from the transfer box.

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

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



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 Girling 'Crimson' Brake and Clutch Fluid. Specification SAE 70 R 3.

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

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 Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).

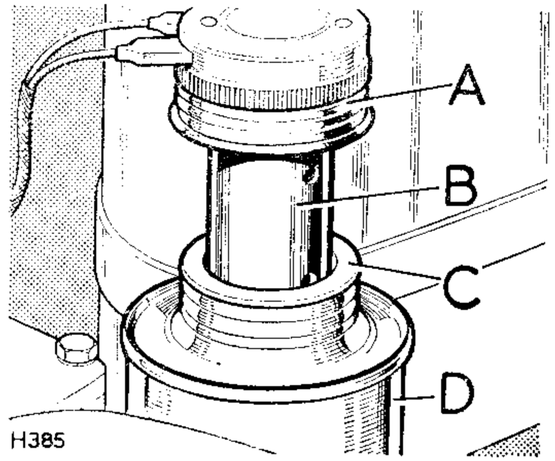
If significant topping-up is required, check master cylinder, wheel cylinders and brake pipes for leakage; any leakage must be rectified immediately.

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:

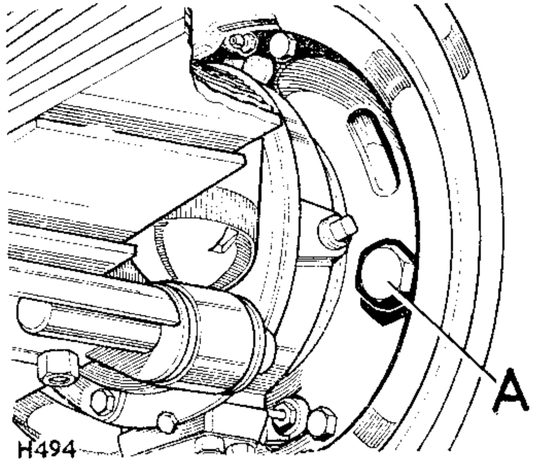
Ignition 'on', handbrake 'off'; unscrew and lift filler cap 1 in. (25 mm), warning light should be illuminated.

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



Brake fluid reservoir

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



Wheel brake adjustment, 88 models

A—Adjustment bolt

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.

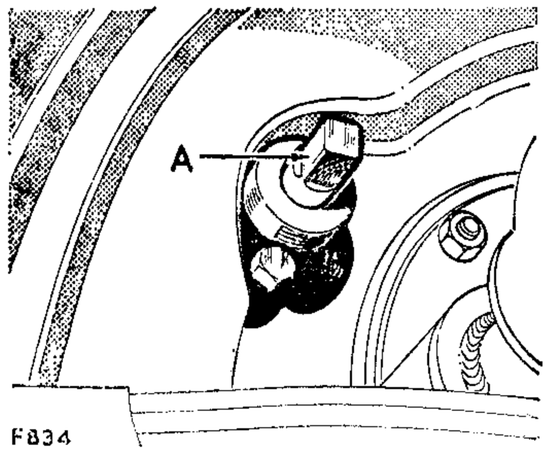
Any rectification necessary should be carried out by a Rover Distributor or Dealer.

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*



Wheel brake adjustment, 109 and Forward Control models

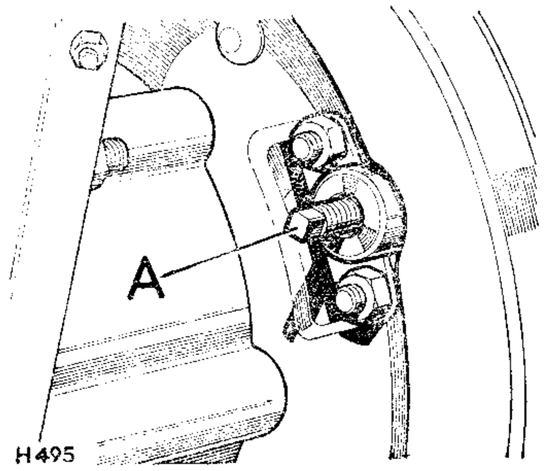
A—Adjustment bolt

Jack up each wheel in turn. 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. 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. Repeat for the other three wheels.

109 *and Forward Control models*

Each shoe is independently set by means of an adjuster operating through a serrated snail cam.

1. With the vehicle jacked up, ensure that the wheels rotate freely; slacken off the adjusters if necessary by turning anti-clockwise.
2. Turn the adjuster for each shoe clockwise until the shoe just brushes the brake drum, then slacken off two serrations.



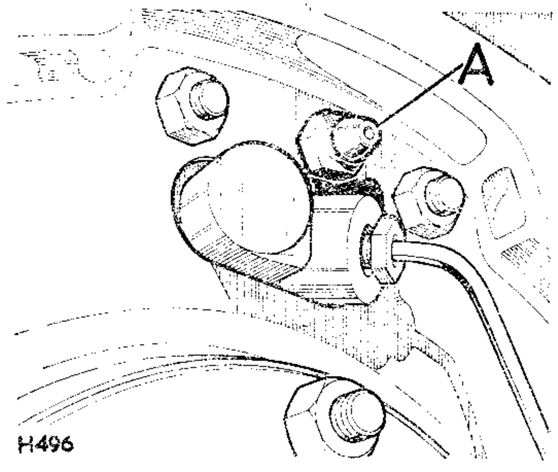
Transmission brake adjustment

A—Adjuster bolt

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.



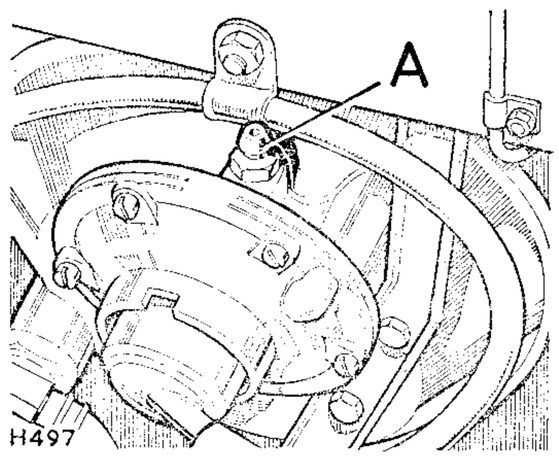
Brake bleed nipple

A—Bleed nipple

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 models.

1. Slacken the adjusters off on all brake shoes.
2. Forward Control 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.



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. Girling Crimson Brake Fluid. Specification SAE 70 R3.

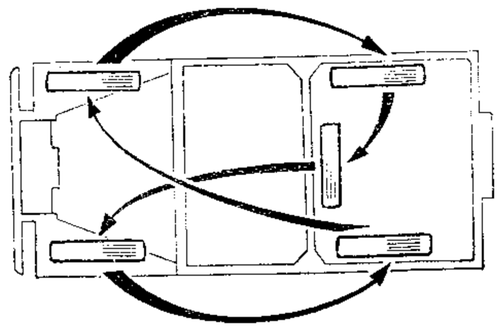
Note particularly that the fluid reservoir for the brake on 'Regular' and 'Long' models is the outer portion of the combined reservoir.

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, 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

H498

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.

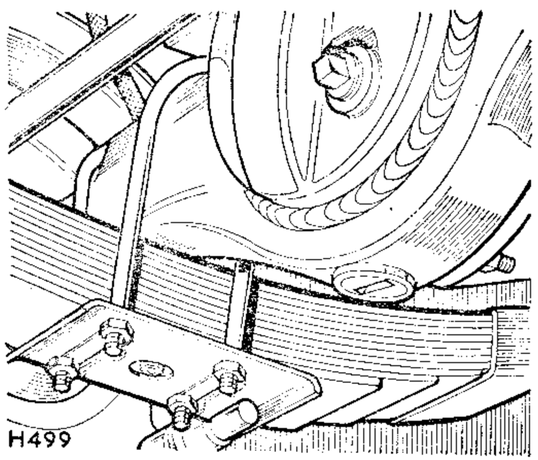
Tyre pressures—Every month and at every maintenance attention

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)	
88 models		Front	Rear	Front	Rear	Front	Rear	Front	Rear
Avon or Dunlop 6.00 x 16.00	lb/sq in. kg/cm²	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/cm²	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/cm²	25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Michelin XY 7.50 x 16.00	lb/sq in. kg/cm²	15 1,0	15 1,0	15 1,0	22 1,5	10 0,7	10 0,7	10 0,7	16 1,1
109 models except Forward Control									
Avon or Dunlop 7.50 x 16.00	lb/sq in. kg/cm²	25 1,7	25 1,7	25 1,7	36 2,5	12 0,8	12 0,8	15 1,0	24 1,6
Michelin XY 7.50 x 16.00	lb/sq in. kg/cm²	20 1,4	20 1,4	20 1,4	35 2,4	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/cm²	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.

Road springs

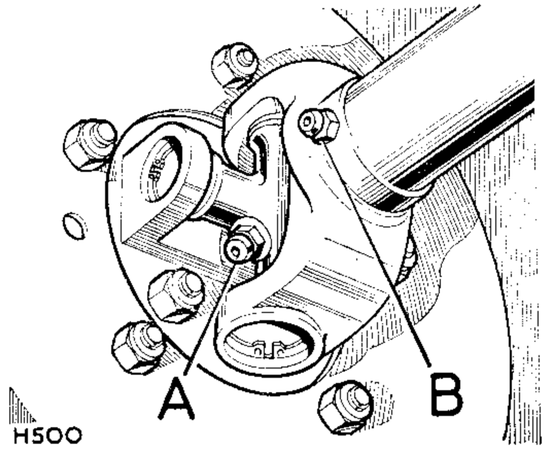


Body, propeller shaft and road springs—Every 12,000 miles (18.000 km)

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

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.



Propeller shaft lubrication

A—Nipple for sliding portion. Plug on front shaft

B—Nipple for universal joint

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)

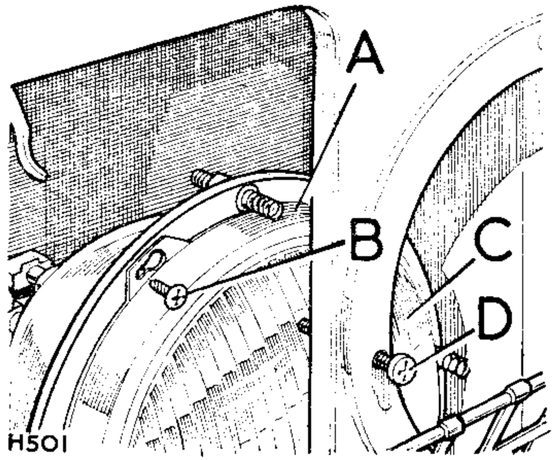
This operation is best done with special equipment and should be carried out by your local Rover Distributor or Dealer.

Oilcan lubrication—Every 8,000 miles (12.000 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

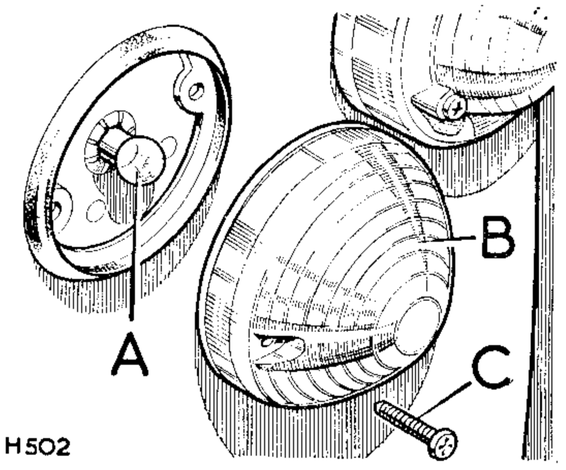
To replace light unit or bulb:

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.



H502

Side, tail and stop lamp bulb replacement

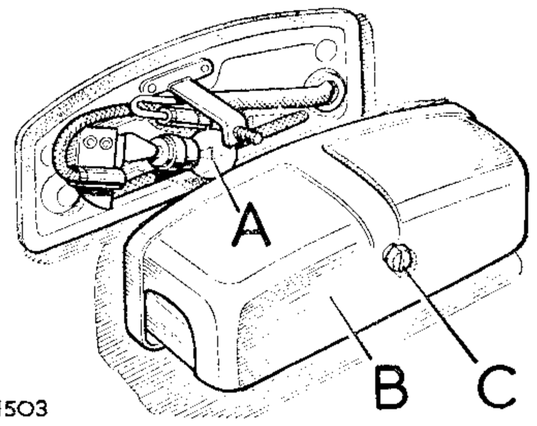
A—Bulb
B—Lens
C—Screw retaining lens

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.



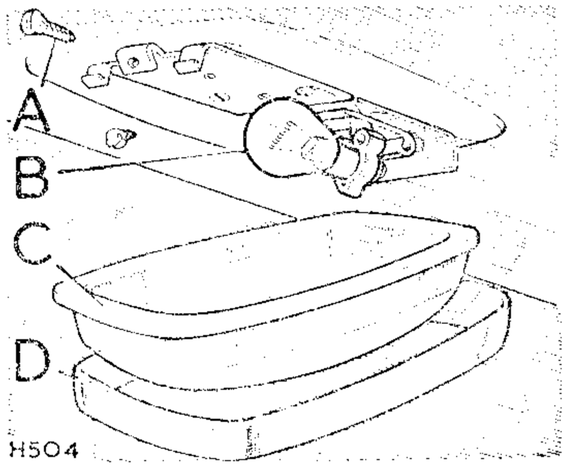
H503

Rear number plate illumination lamp

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

Interior light

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



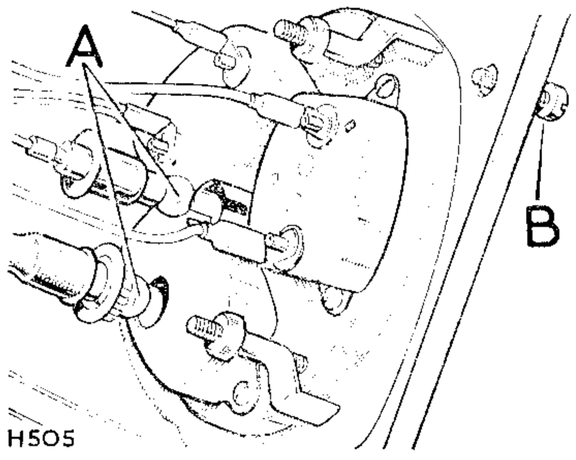
Interior light (where applicable)

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:

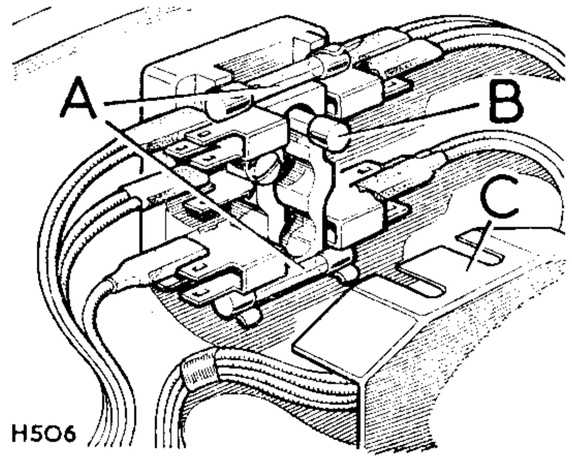
1. Remove screws retaining instrument panel.
2. Bulbs can then be replaced as necessary.

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 box

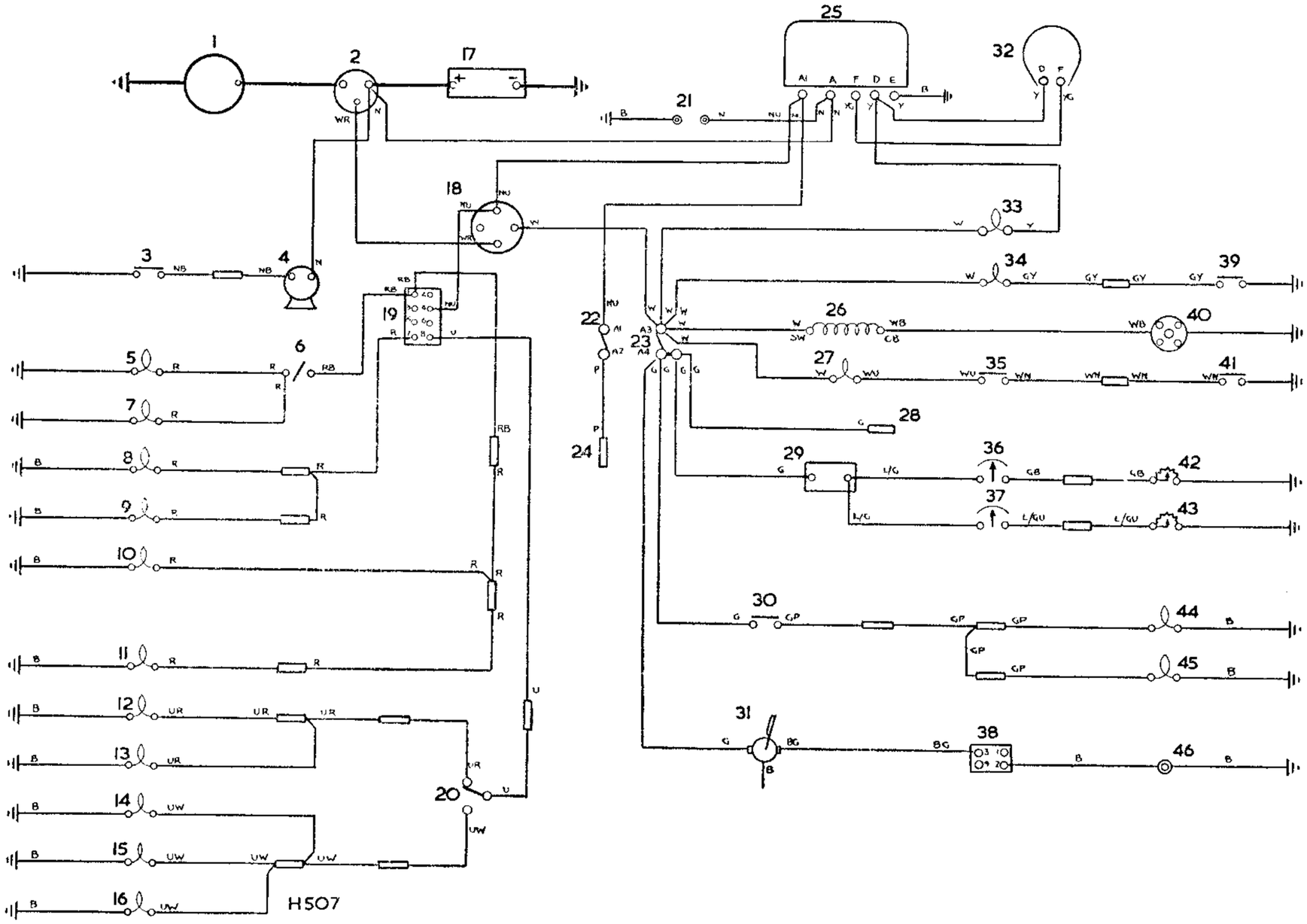
A—Fuses

B—Spare fuse

C—Cover

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, 2¼ litre 'Regular', 'Long' and Station Wagon Petrol models, negative earth

Key to circuit diagram, 2¼ litre 'Regular', 'Long' and Station Wagon Petrol models, negative earth

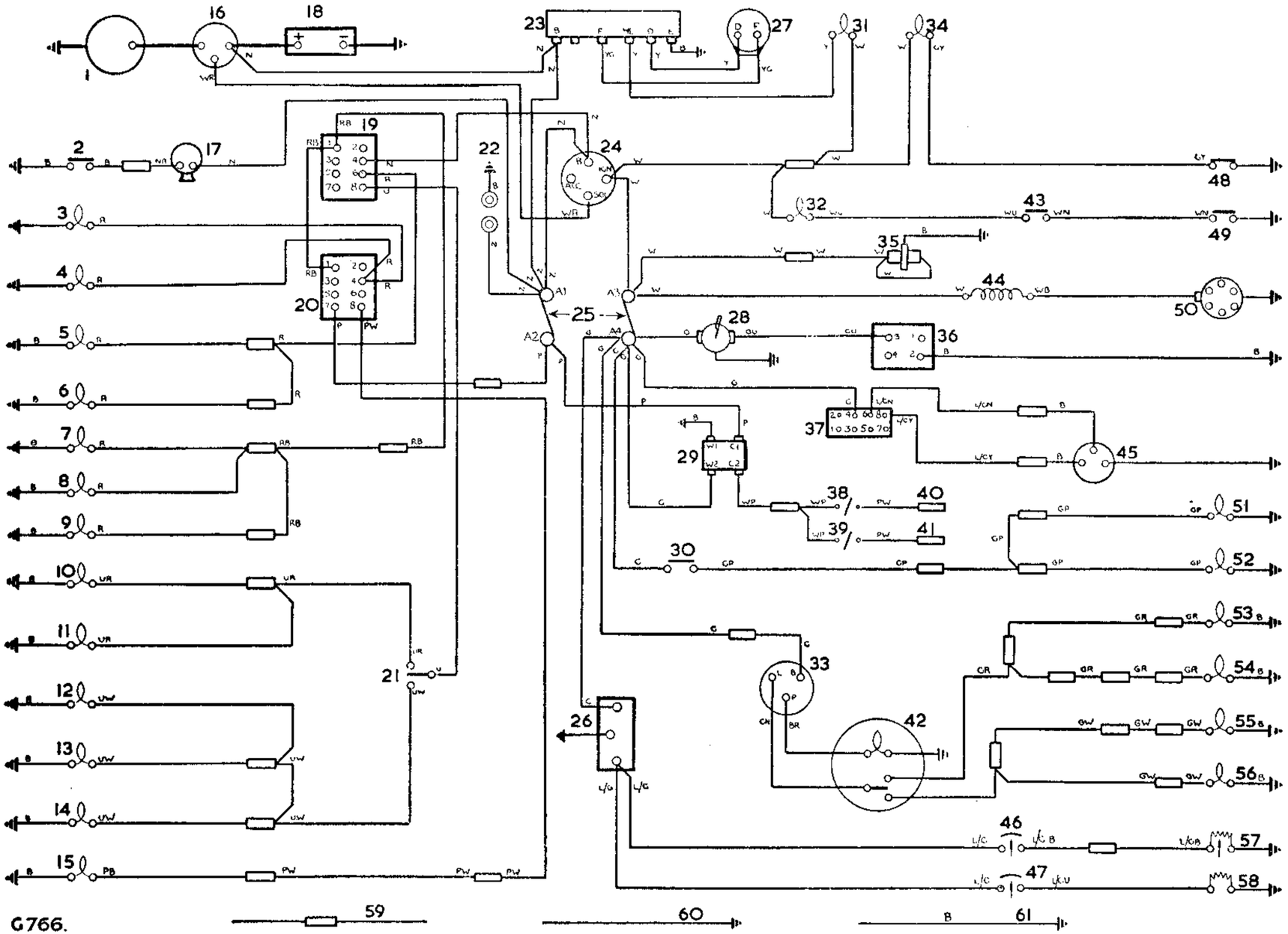
1 Starter motor
2 Solenoid, starter motor
3 Horn push button
4 Horn
5 Panel light, speedometer
6 Switch, panel light
7 Panel light, instruments
8 Side lamp, RH
9 Side lamp, LH
10 Tail lamp, RH
11 Tail lamp, LH
12 Headlamp, RH, dipped beam
13 Headlamp, LH, dipped beam
14 Headlamp, LH, main beam
15 Headlamp,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

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



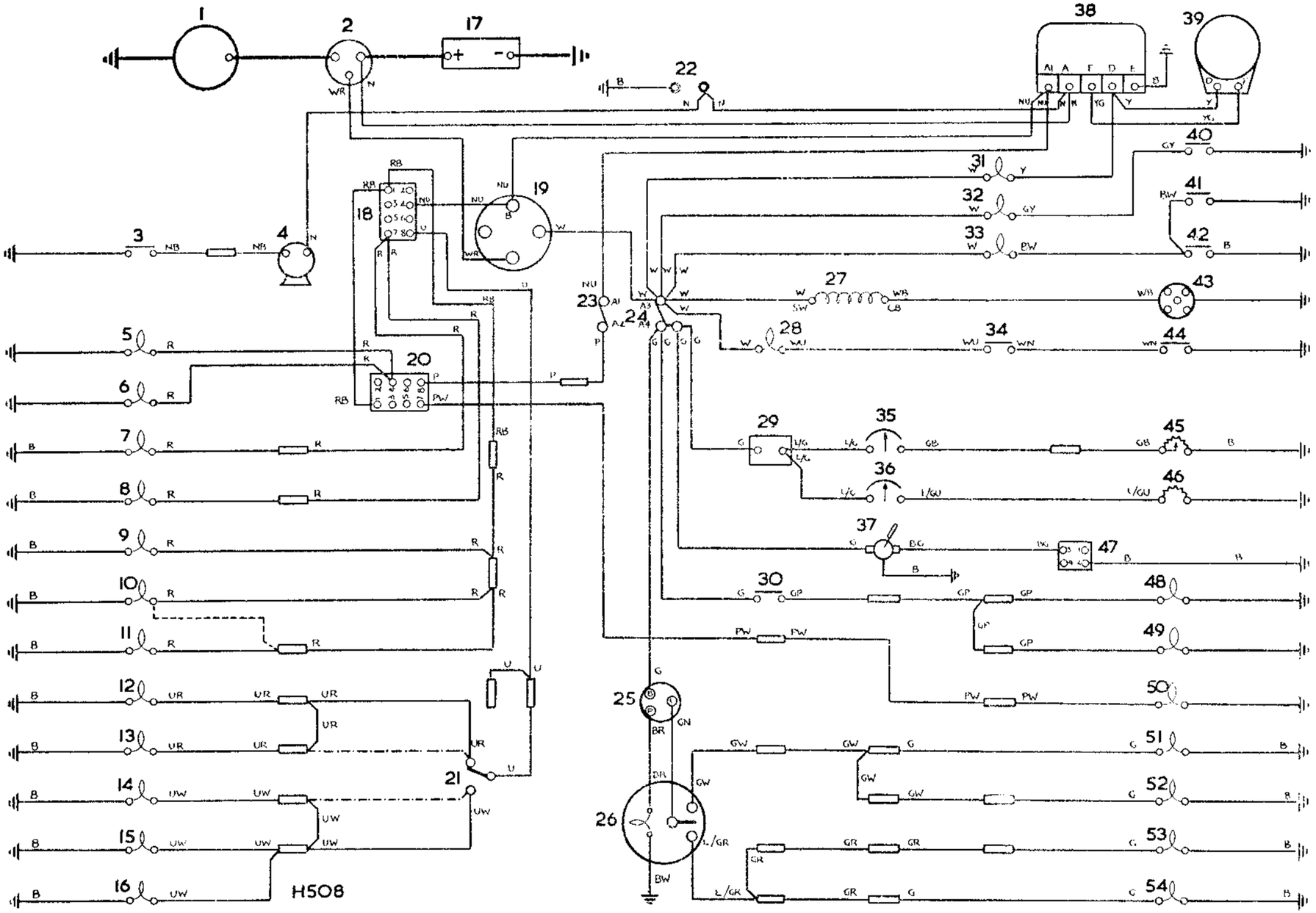
Circuit diagram, North America dollar area 109 Station Wagon

Key to circuit diagram, North America dollar area 109 Station Wagon

1 Starter motor
2 Horn push
3 Panel illumination
4 Panel illumination
5 Side lamp, RH
6 Side lamp, LH
7 Tail lamp, RH
8 Number plate illumination
9 Tail lamp, LH
10 Headlamp dip, RH
11 Headlamp dip, LH
12 Headlamp main beam, RH
13 Headlamp main beam, LH
14 Headlamp main beam warning light
15 Interior light
16 Starter solenoid
17 Horn
18 Battery
19 Lighting switch
20 Panel and interior light switch
21 Foot dipper switch
22 Inspection lamp socket
23 Voltage regulator
24 Ignition/starter switch
25 Fuses
26 10-volt stabiliser
27 Dynamo
28 Windscreen wiper motor
29 Relay for heated windscreen
30 Stop light switch
31 Ignition warning light
32 Choke warning light
33 Direction indicator unit
34 Oil pressure warning light
35 Dual petrol pump
36 Windscreen wiper switch
37 Heater switch
38 Switch for heated windscreen, screen No. 1
39 Switch for heated windscreen, screen No. 2
40 Heated windscreen, screen No. 1
41 Heated windscreen, screen No. 2
42 Direction indicator switch
43 Switch, cold start on control
44 Coil
45 Two-speed heater unit
46 Fuel gauge
47 Water temperature gauge
48 Oil pressure switch
49 Switch, cold start in cylinder head
50 Distributor
51 Stop lamp, LH
52 Stop lamp, RH
53 Indicator lamp, LH front
54 Indicator lamp, LH rear
55 Indicator lamp, RH rear
56 Indicator lamp, RH front
57 Fuel tank unit
58 Water temperature transmitter
59 Snap connector
60 Earth connections via terminals or fixing
61 Earth connections made via cables

Cable colour code

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



Circuit diagram, 2¼ litre Forward Control Petrol models, negative earth

Key to circuit diagram, $2\frac{1}{4}$ litre Forward Control Petrol models, negative earth

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

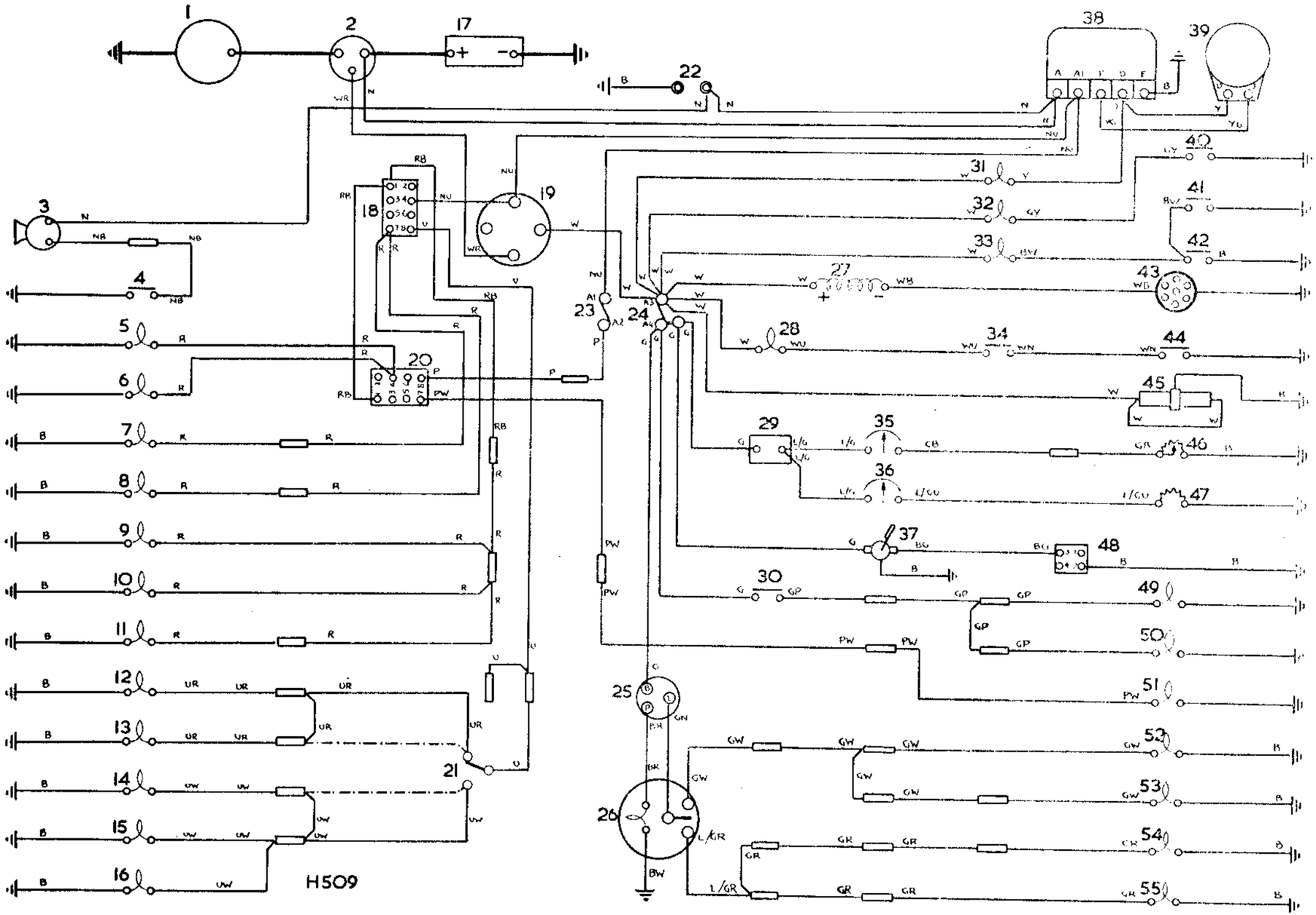
Dotted lined indicate circuit on LHD models

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, 2.6 litre Forward Control Petrol models, negative earth

Key to circuit diagram, 2.6 litre Forward Control Petrol models, negative earth

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

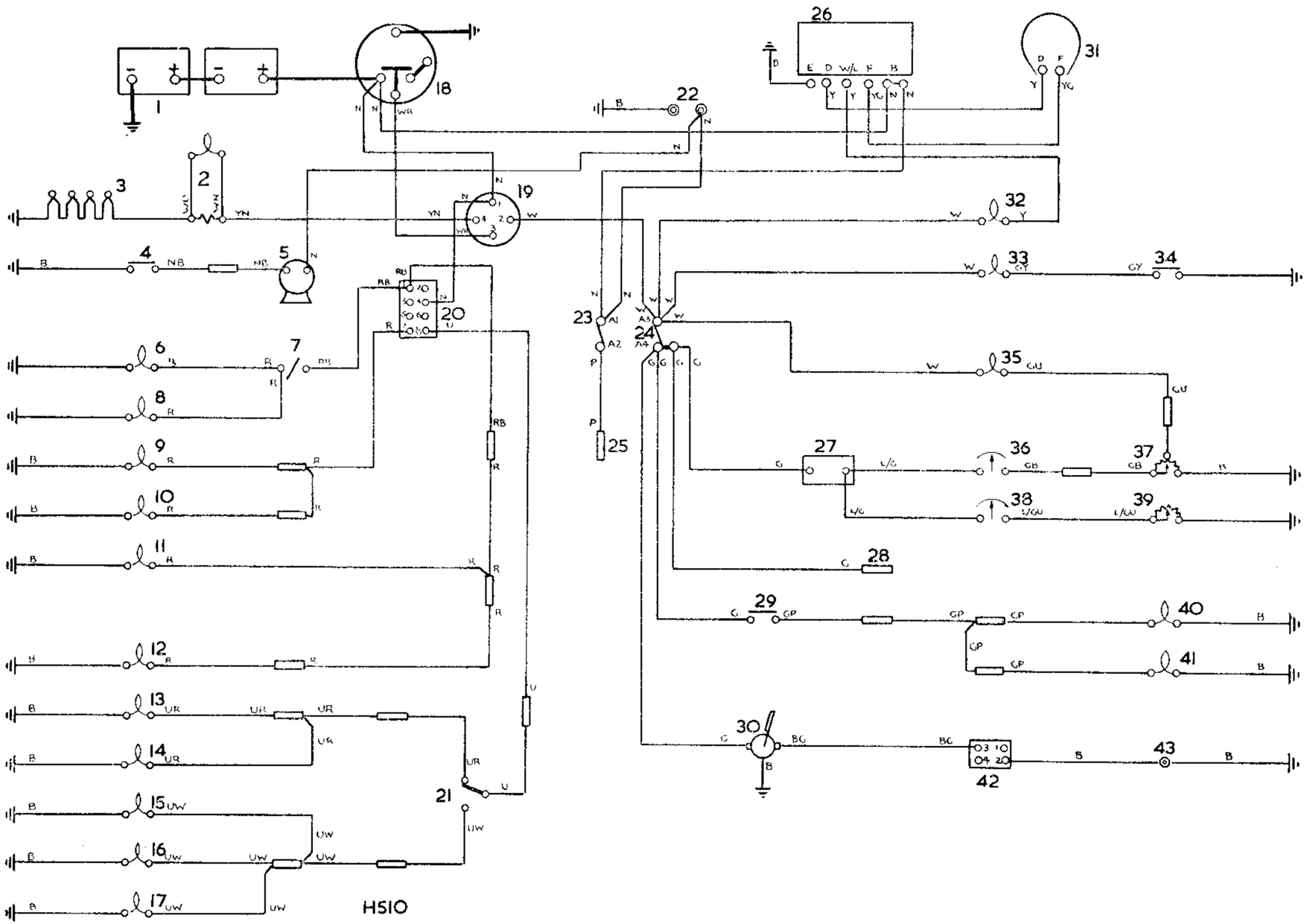
Dotted lines indicate circuit on LHD models

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, 2¼ litre 'Regular', 'Long' and Station Wagon Diesel models, negative earth

Key to circuit diagram, 2¼ litre 'Regular', 'Long' and Station Wagon Diesel models, negative earth

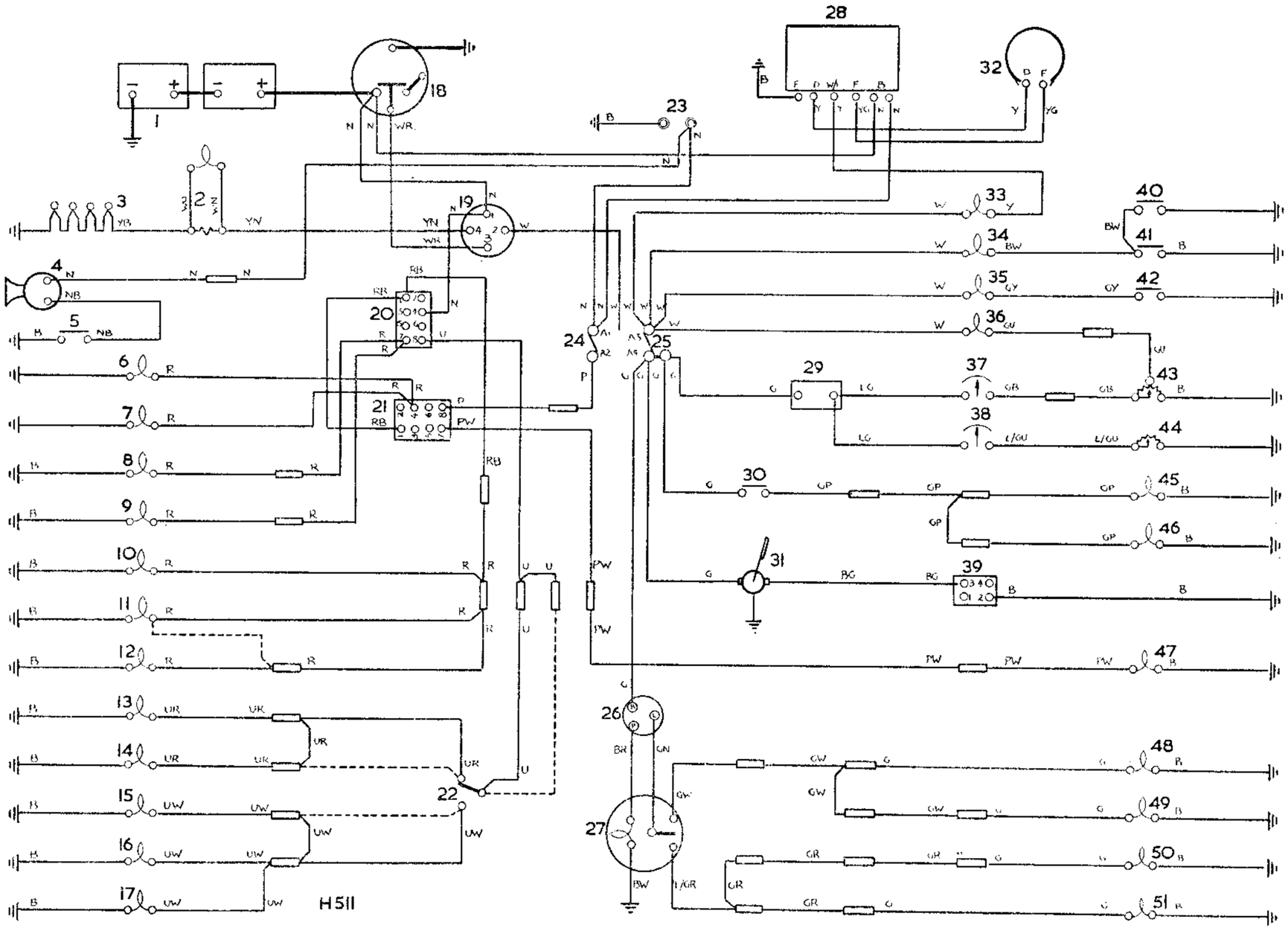
1 Batteries, two 6 volt
2 Warning light and resistor, heater plugs
3 Heater plugs
4 Horn push button
5 Horn
6 Panel light, speedometer
7 Switch, panel light
8 Panel light, instrument
9 Side lamp, RH
10 Side lamp, LH
11 Tail lamp, RH
12 Tail lamp, LH
13 Headlamp, RH, dipped beam
14 Headlamp, LH, dipped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

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, 2¼ litre Forward Control Diesel models, negative earth

Key to circuit diagram, 2¼ litre Forward Control Diesel models, negative earth

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

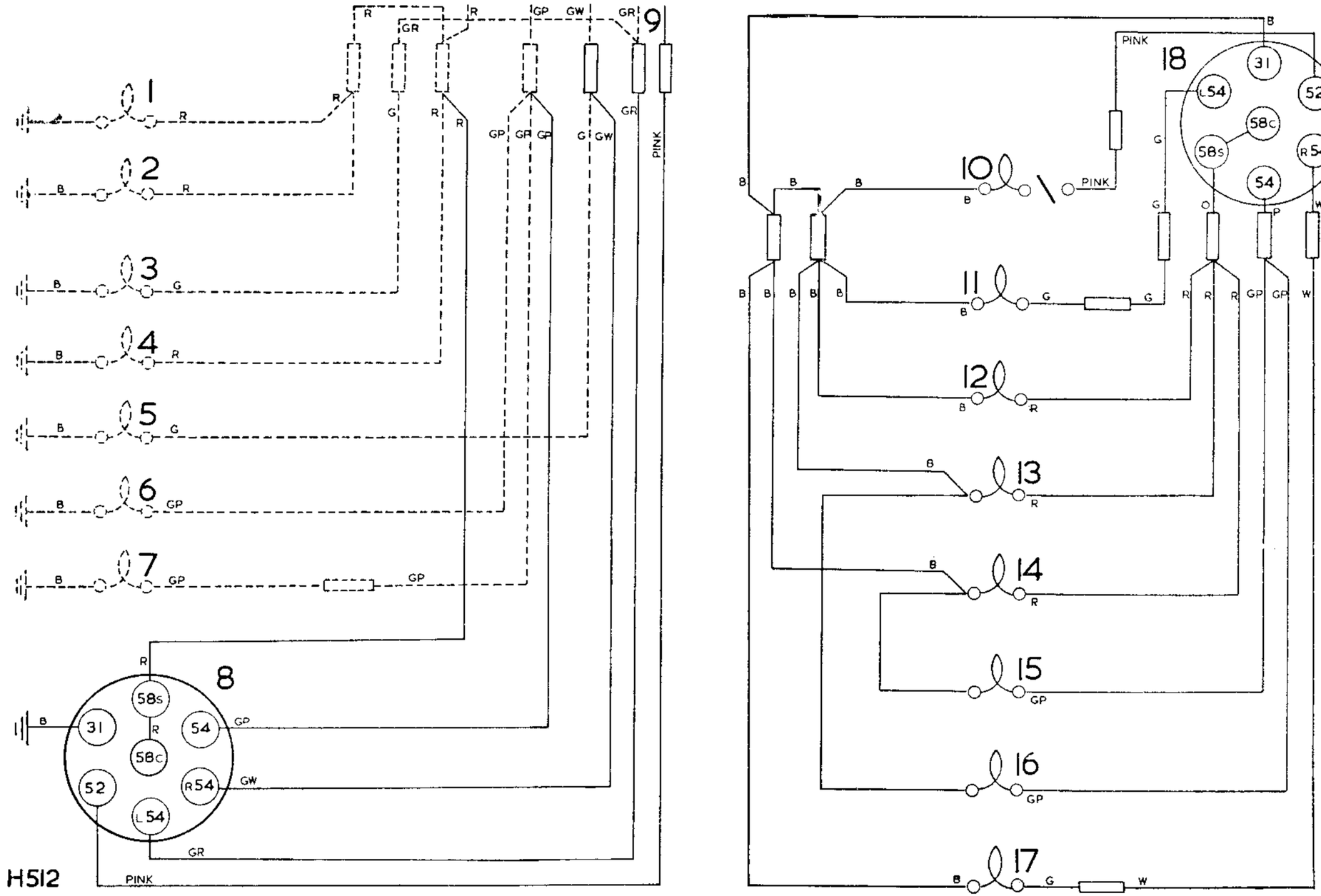
Dotted lines indicate circuit on LHD models

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, 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.

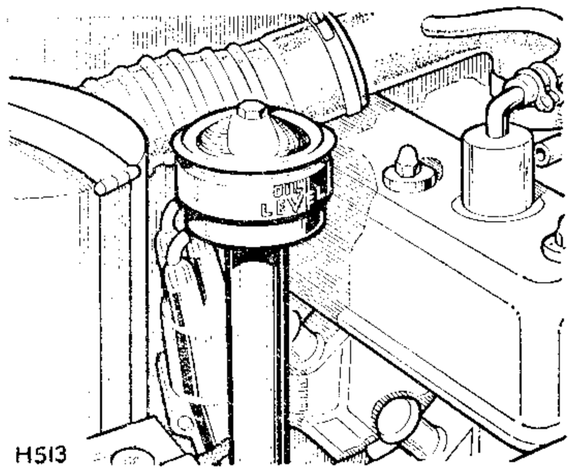
Dust-proofed engine breather, Petrol models

Suitable for $2\frac{1}{4}$ litre petrol engines only. This breather replaces the normal oil filler cap. It must not be fitted to vehicles operating under cold and misty conditions.

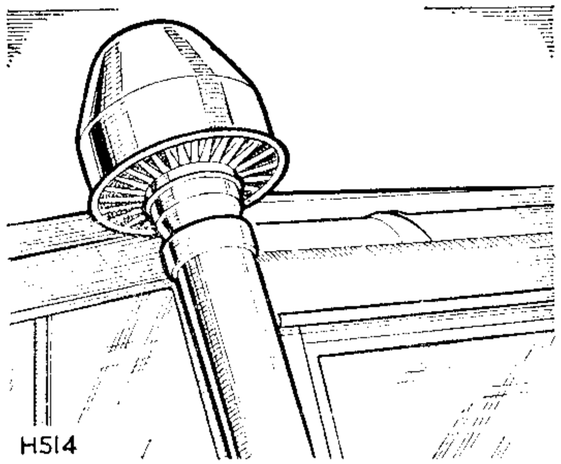
The oil in the engine breather must be renewed weekly. If, however, the vehicle is operating under extremely dusty conditions, this change of oil should be carried out daily.

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 $2\frac{1}{4}$ litre 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.

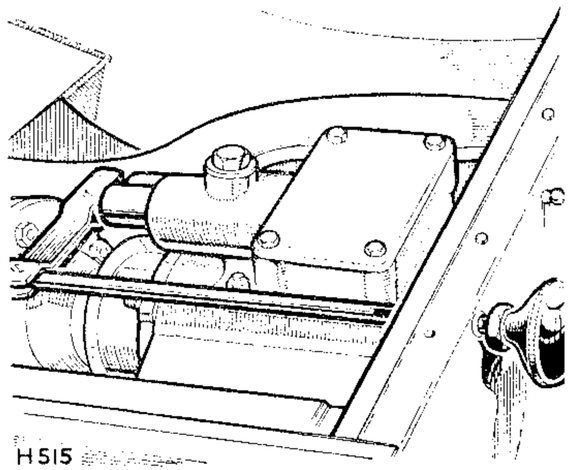
Power take-off units

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.

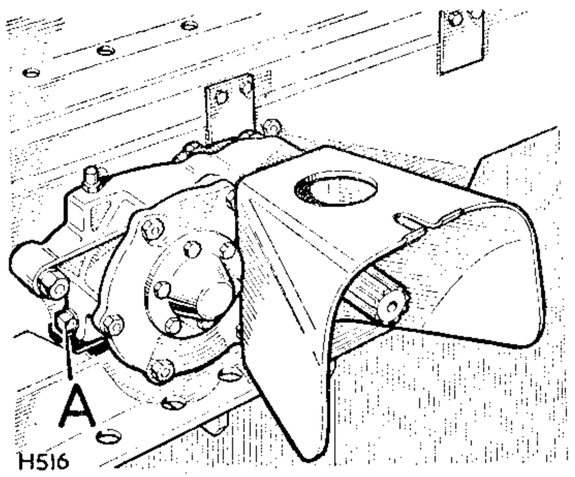


Centre power take-off 'Regular' and 'Long' models illustrated

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.



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

A—Oil level plug

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

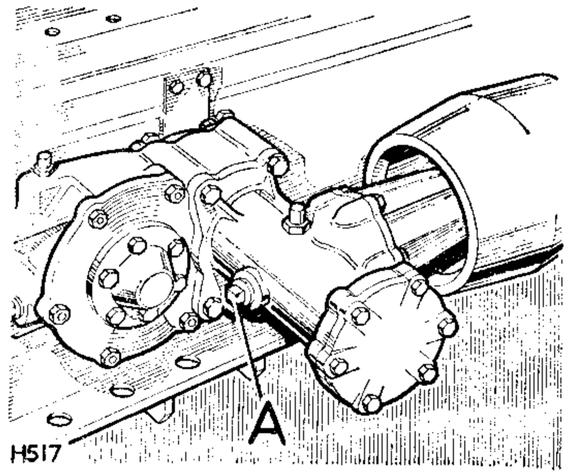
The rear power take-off unit, mounted on the rear chassis cross-member, is driven by a propeller shaft from the flanged output shaft at the rear of the gearbox; the standard SAE six-splined output shaft is on the centre-line of the vehicle and provides power for towed equipment.

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.



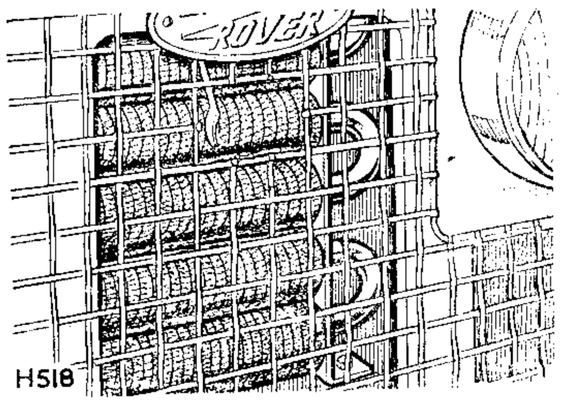
Rear drive pulley 'Regular' and 'Long' models

A—Oil filler-level plug

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).



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
20 BHP at 2,500 RPM
10 BHP at 3,000 RPM
} Diesel models

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

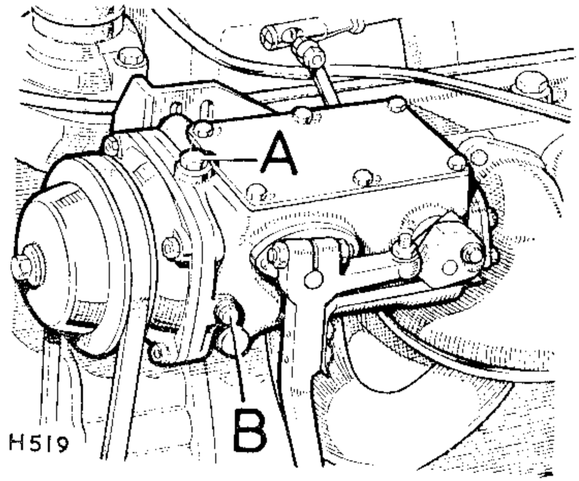
Running time: 30 minutes.

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, Petrol models

A—Oil level plug
B—Oil drain plug

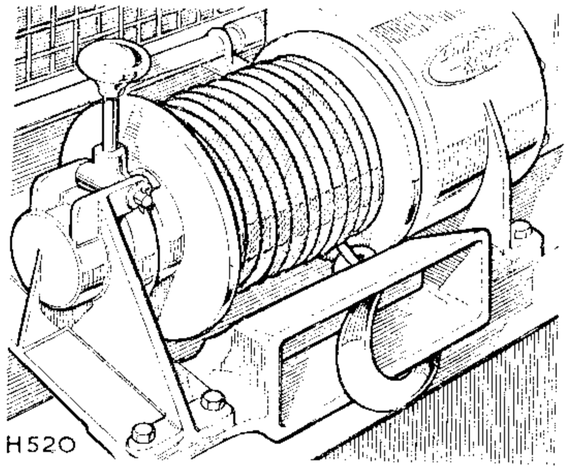
Engine governor maintenance

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.

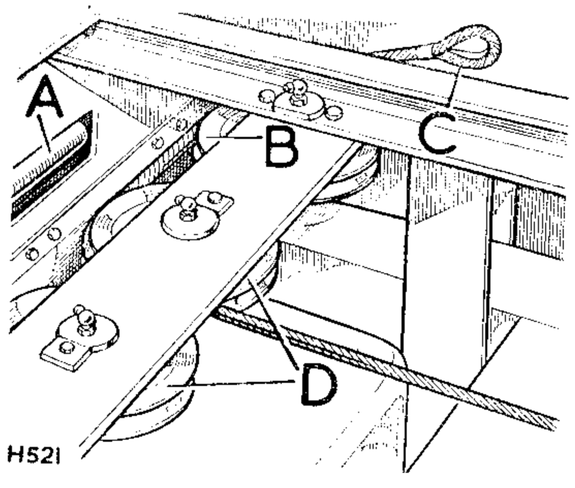
Hydraulic winch

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.



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.

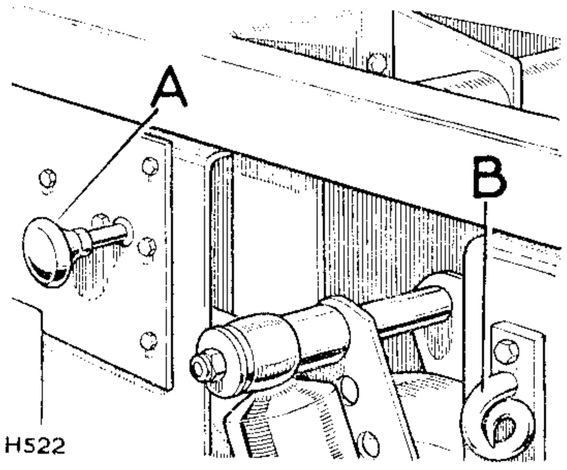
Pass the rope through the box, then replace the roller, bolt, spring washer and nut. Retighten both nuts and refit the rope hook.

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, Forward 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).

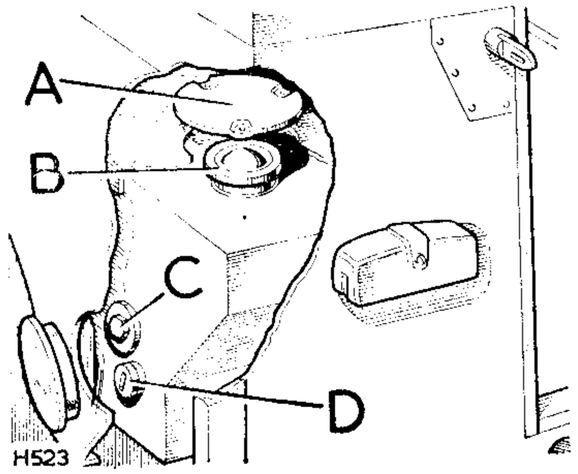
   This may be obtained by such means as winching in another vehicle on which the brakes are lightly applied, or alternatively by anchoring the cable to a tree or ground anchor and allowing the winch to pull the vehicle along, while the brakes are held lightly applied.

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.

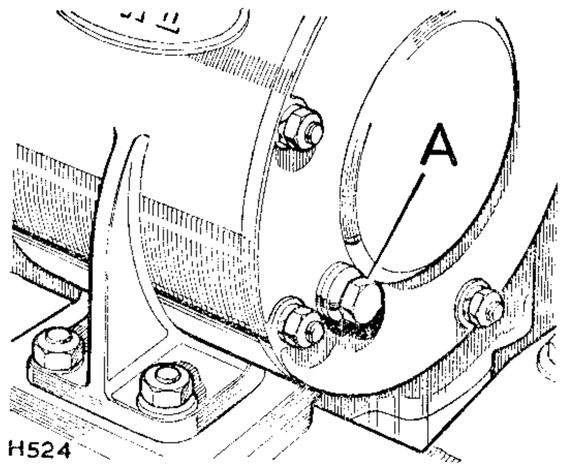
Capacity:

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.

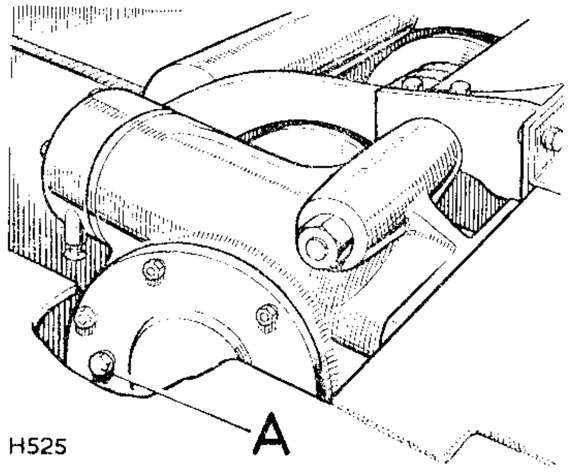
   At the same time, lubricate with oil, the drum shaft and control lever and, on Forward Control models, the control rod relays (2).

   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±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.

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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	
Gross	77 at 4,250 rpm
Installed	67 at 4,000 rpm
Maximum torque	
Gross	124 lb ft (17 mkg) at 2,500 rpm
Installed	116 lb ft (16 mkg) at 1,500 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 Regular fuels
Ignition timing to be set to	6° BTDC when Premium fuels are used
Tappet clearance, inlet	.010 in. (0,25 mm) } Engine at
Tappet clearance, exhaust	.010 in. (0,25 mm) } running temperature
Valve timing (No. 1 exhaust valve peak)	95° BTDC

Oil pressure	55 to 65 lb/sq in. (3,8 to 4,6 kg/cm²) 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	
Except North America dollar area 109 Station Wagon	7.0:1
North America dollar area 109 Station Wagon	8.8:1
BHP	
Gross 7.0:1 compression ratio	90 at 4,500 rpm
Installed 7.0:1 compression ratio	83 at 4,500 rpm
Gross 8.8:1 compression ratio	123 at 5,000 rpm
Installed 8.8:1 compression ratio	109 at 5,000 rpm
Maximum torque	
Gross 7.0:1 compression ratio	132 lb ft (18 mkg) at 1,500 rpm
Installed 7.0:1 compression ratio	128 lb ft (17,7 mkg) at 1,500 rpm
Gross 8.8:1 compression ratio	142 lb ft (19,63 mkg) at 3,000 rpm
Installed 8.8:1 compression ratio	136.5 lb ft (18,8 mkg) at 2,500 rpm
Firing order	1, 5, 3, 6, 2, 4

Sparking plugs	
7.0:1 compression ratio	Champion N5
8.8:1 compression ratio	Champion N4
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)	2° BTDC using regular fuel, or 6° BTDC with Premium fuel
Tappet clearance, inlet	.006 in. (0,15 mm) Engine at running temperature
Tappet clearance, exhaust	.010 in. (0,25 mm) Engine at running temperature
Valve timing (No. 1 exhaust valve peak)	
7.0:1 compression ratio	104 BTDC
8.8:1 compression ratio	106 BTDC
Oil pressure	40 to 55 lb/sq in. (2,8 to 4,0 kg/cm²) 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	62 at 4,000 rpm
Torque	103 lb ft (14 mkg) at 1,800 rpm
Firing order	1, 3, 4, 2
Tappet clearance, inlet	.010 in. (0,25 mm) Engine cold or at
Tappet clearance, exhaust	.010 in. (0,25 mm) running temperature
Valve timing (No. 1 exhaust valve peak)	109° BTDC
Oil pressure	50 to 60 lb/sq in. (3,5 to 4,2 kg/cm²) 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

Clutch, 6-cylinder models

Type	9½ in. (241 mm) diameter diaphragm type clutch. Hydraulic operation
Adjustment	Hydrostatic clutch. No adjustment necessary

Main gearbox

Type	Single helical constant mesh with synchro-mesh on top and third speeds

Transfer box

Type	Two speed reduction on main gearbox output
Front wheel drive	Two/four wheel drive control on transfer box output

Propeller shafts

Type	Open type to both axles

Rear axle

Type	Spiral bevel; fully floating shafts
Ratio	4.7:1

Front axle

Differential	Spiral bevel
Front wheel drive	Enclosed universal joints
Ratio	4.7:1

Gear ratios, 'Regular', 'Long' and Station Wagon

Main gearbox:	Top	Direct
	Third	1.50:1
	Second	2.22:1
	First	3.6:1
	Reverse	3.02:1
Transfer gearbox	High transfer	1.148:1
	Low transfer	2.35:1

Overall ratio (final drive):	In high transfer	In low transfer
Top	5.4:1	11.1:1
Third	8.05:1	16.5:1
Second	12.0:1	24.6:1
First	19.4:1	39.7:1
Reverse	16.3:1	33.2:1

Gear ratios, Forward Control models

Main gearbox:	Top	Direct
	Third	1.50:1
	Second	2.22:1
	First	3.6:1
	Reverse	3.02:1
Transfer gearbox:	High transfer	1.53:1
	Low transfer	3.27:1

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
Carburetter	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 inside of right-hand sub-frame side-member
Carburetter (Except North America dollar area)	SU HD 6 single horizontal, dust-proof
Air cleaner (109 Station Wagon)	Oil bath type with integral centrifugal pre-cleaner
Carburetter (North America dollar area)	SU HD 8 single horizontal, dust-proof
Air cleaner (109 Station Wagon)	Paper element type

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

Injection system, Diesel models

Injector pump	Distributor type, self-governing
Injectors: Type	CAV Pintaux
Start of injection	16° BTDC

Cooling system

Type	Pump, fan and thermostat; pressurised to 9 lb/sq in. (0,6 kg/cm²)

Electrical system, Petrol models

Type	Negative earth
Voltage	12
Battery capacity	57 AH
Ignition system	Coil
Charging circuit	Compensated voltage control

Electrical system, Diesel models

Type	Negative earth
Voltage	12. Two 6 volt batteries in series
Battery capacity	120 AH
Charging circuit	Current-voltage control

Replacement bulbs and units

Headlamps with bulbs:	
RHD except Sweden	Lucas 414, 12 v, 50/40 w
RHD Sweden only	Lucas 410, 12 v, 45/40 w, Duplo
LHD except North America and Europe	Lucas 415, 12 v, 50/40 w
LHD Europe except France	Lucas 410, 12 v, 45/40 w, Duplo
LHD France	Lucas 411, 12 v, 45/40 w, Duplo yellow
Headlamps with sealed beam units:	
RHD	Lucas 54521060
LHD except Europe	Lucas 54520481
LHD North America	Sealed beam unit, 12 v

Sidelamps	Lucas 207, 12 v, 6 w
Stop, tail lamps	Lucas 380, 12 v, 21/6 w
Flasher lamps	Lucas 382, 12 v, 21 w
Rear number plate lamp	Lucas 989, 12 v, 4 w
Instrument panel lights	Lucas 987, 12 v, 2.2 w MES
Warning lights, basic	Lucas 987, 12 v, 2.2 w MES
Warning light, brakes, Forward Control models	Lucas 281, 12 v, 2 w
Warning light, heater plugs, Diesel models	Lucas 982, 6 v, 1.8 w, MES
Warning light, fuel level, Diesel models	Magnetex GBP, 12 v, 2.8 w
Interior light	Lucas 382, 12 v, 21 w

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 models and North America dollar area 109 Station Wagon)
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	$1\frac{1}{2}°$	
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 Forward Control models	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 } basic 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 109 Station Wagon and Forward Control	10 gallons	12 gallons	45
Fuel tank, 109 Station Wagon and Forward Control	16 gallons	19 gallons	73
Cooling system, Petrol models, except Forward Control	18 pints	21½ pints	10,25
Cooling system, Forward Control models, 4-cylinder Petrol	19 pints	22¾ pints	10,8
Cooling system, Forward Control models, 6-cylinder Petrol	23 pints	27¾ pints	13,0
Cooling system, 'Regular' and 'Long' Diesel models	17½ pints	21 pints	10,0
Cooling system, Forward Control Diesel models	18 pints	21½ pints	10,5
Cooling system, North America dollar area, 109 Station Wagon	25 pints	30 pints	14,25
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 Oil	*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 CR20	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 Oil	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Teresso 43 or Essofleet HD 10W	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energrease L2	Castrolease 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 good quality glycol-base solution							

***Rear differential, limited slip type:** 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.

General data

Dimensions and Weights	88 Basic		88 Station Wagon		109 Basic		109 Station Wagon		110 Forward Control	
	British	Metric	British	Metric	British	Metric	British	Metric	British	Metric
Overall length	142⅜ in.	3,62 m	142⅜ 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	76⅞ in.	1,95 m	77⅞ in.	1,98 m	81 in.	2,06 m	81⅜ in.	2,07 m	88¼ 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	109¾ in.	2,77 m
Track	51½ in.	1,31 m	51½ in.	1,31 m	51½ in.	1,31 m	51½ 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	8¾ in.	222 mm	8¾ in.	222 mm	—	—	—	—	—	—
Unladen ground clearance under differentials, 7.50 x 16 tyres	—	—	—	—	9¾ in.	248 mm	9¾ 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	88 Basic		88 Station Wagon		109 Basic		109 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	—	—	72¾ in.	1,85 m	—	—	123½ in.††	3,14 m††
width (between cappings)	56⅞ in.	1,44 m	—	—	56⅞ 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)	36¼ in.	921 mm	—	—	36¼ 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 carburetter 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.
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 shaft.
Road test.

AT 8,000 MILES (12.000 KM)

As 4,000 miles (6.000 km) plus
Renew external oil filter.
Clean breather filter.
Petrol models- 6-cylinder: Oil carburetter hydraulic damper
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
Air cleaner, paper element type: Replace element.
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.
Drain and refill gearbox and transfer box.
Drain and refill differentials.
Drain and refill front swivel pin housings.
Lubricate dynamo.
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 joint.

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).

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).

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LAND-ROVER
NEW VEHICLE
PRE-DELIVERY
INSPECTION

Carried out by
Rover Distributor or
Dealer

NAME.....

ADDRESS.....

.....

.....

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

Signature.....

Date.....

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

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. **Diesel models.** Check the battery electrolyte level, and that the battery post terminals and the battery fixings are secure (the second battery is positioned in the seat tool box).

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 Owner's Manual.)

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 AT
1,000 MILES (1.500 KM)
Carried out by
Rover Distributor or Dealer

NAME.....

ADDRESS.....

.....

.....

We certify that the Free Service has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

LAND-ROVER

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

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

Engine

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

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

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.

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

Petrol models: Check carburetter 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. Check anti-freeze specific gravity in winter, ½ to ¾ in. (12 to 19 mm) below bottom of filler neck.
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.

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.

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 Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).

Fuel system

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

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

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

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

Check all fuel pipes and connections for leakage.

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level; 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.

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

Drain and refill differentials.

Drain and refill front swivel pin housings.

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 Girling 'Crimson' Brake Fluid (Specification SAE 70 R3).
Check brake pipes and hoses for chafing and looseness. Report any defects.

Wheels and tyres

Check tyre pressures monthly.

Check tyre pressures and inspect tyre treads.

Check all road wheel securing nuts.

Body and road springs

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.

*Lubricate sliding joints and journals as applicable.

*Check securing bolts for tightness.

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

General

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

Road test

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 AT 4,000 MILES (6.000 KM)

Carried out by Rover Distributor or Dealer

NAME .....

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 .....

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

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**

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 carburetter slow running. Petrol models: Check sparking plugs. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 on North America dollar area 109 Station Wagon 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), $\frac{1}{2}$ 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.*	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.
Electrical *Check battery acid level weekly when operating under severe conditions.*	Check battery acid level.

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 4,000 MILES (6.000 KM)

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.

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.

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

MAINTENANCE ATTENTION AT 8,000 MILES (12.000 KM)

Carried out by Rover Distributor or Dealer

NAME.....

ADDRESS.....

.....

We certify that the 8,000 miles (12.000 km) maintenance attention has been completed

Signature.....

Mileage .....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

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

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**

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.

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. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 for North America dollar area 109 Station Wagon 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), $\frac{1}{2}$ 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.

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.

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level.

Clean, grease and tighten battery terminals.

CONTINUED OVERLEAF

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.

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.

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 12,000 MILES (18.000 KM)

Carried out by Rover Distributor or Dealer

NAME .....

ADDRESS .....

.....

We certify that the 12,000 miles (18.000 km) maintenance attention has been completed

Signature .....

Mileage .....

Km .....

Fuel Petrol/Diesel

Gallons .....

Litres .....

Hours .....

Date .....

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 12,000 MILES (18.000 KM)

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**

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.

Air cleaner, paper element type: Replace element.

Petrol models: Check carburetter slow running.

Petrol models: Clean fuel sediment bowl.

Petrol models: Check sparking plugs. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 for North America dollar area 109 Station Wagon 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.

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level.

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 12,000 MILES (18.000 KM)

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

Axles, front and rear †

Drain and refill differential.

Drain and refill front swivel pin housings.

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.

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.

Body and road springs †

Check all body bolts for tightness.

Check security of 'U' bolts and spring clips.

Check propeller shaft bolts for tightness.

Propeller shafts, front and rear †

*Lubricate sliding joints and journals as applicable.

General

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

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 16,000 MILES (24.000 KM)

Carried out by Rover Distributor or Dealer

NAME.....

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.....

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 16,000 MILES (24.000 KM)

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**

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. 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. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 for North America dollar area 109 Station Wagon models as service replacements. Diesel models: Remove injectors, check and, if necessary, adjust. 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), $\frac{1}{2}$ 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.*	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.
Electrical *Check battery acid level weekly when operating under severe conditions.*	Check battery acid level. Clean, grease and tighten battery terminals.

CONTINUED OVERLEAF

MAINTENANCE ATTENTION AT 16,000 MILES (24.000 KM)

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. 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)

Carried out by Rover Distributor or Dealer

NAME.....

ADDRESS.....

.....

We certify that the 20,000 miles (30.000 km) maintenance attention has been completed

Signature.....

Mileage.....

Km.....

Fuel Petrol/Diesel

Gallons.....

Litres.....

Hours.....

Date.....

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

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**

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 carburetter slow running.

Petrol models: Check sparking plugs. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 for North America dollar area 109 Station Wagon 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), $\frac{1}{2}$ 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.

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.

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level.

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.

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.

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

MAINTENANCE ATTENTION AT 24,000 MILES (36.000 KM)

Carried out by Rover Distributor or Dealer

NAME .....

ADDRESS .....

.....

We certify that the 24,000 miles (36.000 km) maintenance attention has been completed

Signature .....

Mileage .....

Km .....

Fuel Petrol/Diesel

Gallons .....

Litres .....

Hours .....

Date .....

MAINTENANCE ATTENTION UNDER NORMAL ROAD CONDITIONS AT 24,000 MILES (36.000 KM)

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**

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.

Air cleaner, paper element type: Replace element.

Forward Control models: Lubricate fan drive shaft.

Empty, clean and refill oil bath air cleaner.

Petrol models: Check carburetter slow running.

Petrol models: Replace sparking plugs. Use only Champion N8 for 4-cylinder models, Champion N5 for 6-cylinder models and Champion N4 for North America dollar area 109 Station Wagon models.

Petrol models, 6-cylinder: Oil carburetter 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.

Diesel models: Clean fuel sediment bowl.

Diesel models, Forward Control: Clean sedimenter.

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.

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.

Electrical

Check battery acid level weekly when operating under severe conditions.

Check battery acid level.

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 †

Drain and refill differentials.

Drain and refill front swivel pin housings.

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.

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.

Body and road springs †

Check all body bolts for tightness.

Check security of 'U' bolts and spring clips.

Check propeller shaft bolts for tightness.

Propeller shafts, front and rear †

*Lubricate sliding joints and journals as applicable.

Electrical †

Check headlamp beam setting.

Check lights and instruments for correct operation.

General

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

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

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	320	330	430	135	220	190	300	160
8,000	12.000	400	640	660	860	270	440	380	600	320
12,000	18.000	600	960	990	1.290	405	660	570	900	480
16,000	24.000	800	1.280	1,320	1.720	530	880	760	1.200	640
20,000	30.000	1,000	1.600	1,650	2.150	665	1.100	950	1.500	800
24,000	36.000	1,200	1.920	1,980	2.580	800	1.320	1,140	1.800	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 Forward Control models	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 } basic 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 109 Station Wagon and Forward Control	10 gallons	12 gallons	45
Fuel tank, 109 Station Wagon and Forward Control	16 gallons	19 gallons	73
Cooling system, Petrol models, except Forward Control	18 pints	21½ pints	10,25
Cooling system, Forward Control models, 4-cylinder Petrol	19 pints	22¾ pints	10,8
Cooling system, Forward Control models, 6-cylinder Petrol	23 pints	27¾ pints	13,0
Cooling system, 'Regular' and 'Long' Diesel models	17½ pints	21 pints	10,0
Cooling system, Forward Control Diesel models	18 pints	21½ pints	10,5
Cooling system, North America dollar area, 109 Station Wagon	25 pints	30 pints	14,25
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 Oil	*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 CR20	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 Oil	Hyspin 70 or *Castrol XL	Duckham's Q20-50 Motor Oil	Teresso 43 or Essofleet HD 10W	Mobiloil Special or Delvex Special	Havoline 20/20W	*Shell Super Oil or Shell Tellus Oil 27
Lubrication nipples	—	BP Energrease L2	Castrolease 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 good quality glycol-base solution							

***Rear differential, limited slip type:** 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)	
88 models		Front	Rear	Front	Rear	Front	Rear	Front	Rear
Avon or Dunlop 6.00 x 16.00	lb/sq. in. kg/cm²	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/cm²	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/cm²	25 1,7	25 1,7	25 1,7	30 2,1	15 1,0	15 1,0	15 1,0	20 1,4
Michelin XY 7.50 x 16.00	lb/sq. in. kg/cm²	15 1,0	15 1,0	15 1,0	22 1,5	10 0,7	10 0,7	10 0,7	16 1,1
109 models except Forward Control									
Avon or Dunlop 7.50 x 16.00	lb/sq. in. kg/cm²	25 1,7	25 1,7	25 1,7	36 2,5	12 0,8	12 0,8	15 1,0	24 1,6
Michelin XY 7.50 x 16.00	lb/sq. in. kg/cm²	20 1,4	20 1,4	20 1,4	35 2,4	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/cm²	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.

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