LAND ROVER

Service Library

Instruction Manual Series IIA & IIB

Part No. LSM 64 IM

BY APPOINTMENT TO HER MAJESTY THE QUEEN
MANUFACTURERS OF LAND ROVERS AND RANGE ROVERS
LAND ROVER UK LIMITED - SOLIHULL

BY APPOINTMENT TO HER MAJESTY QUEEN ELIZABETH
THE QUEEN MOTHER
MANUFACTURERS OF LAND ROVERS AND SHERPA VANS
LAND ROVER UK LIMITED - SOLIHULL

BY APPOINTMENT
TO H.R.H. THE PRINCE OF WALES
VEHICLE MANUFACTURERS
LAND ROVER UK LIMITED - SOLIHULL

Land-Rover

INSTRUCTION MANUAL

Series IIA & IIB

LAND - ROVER

Published by
Land Rover Ltd

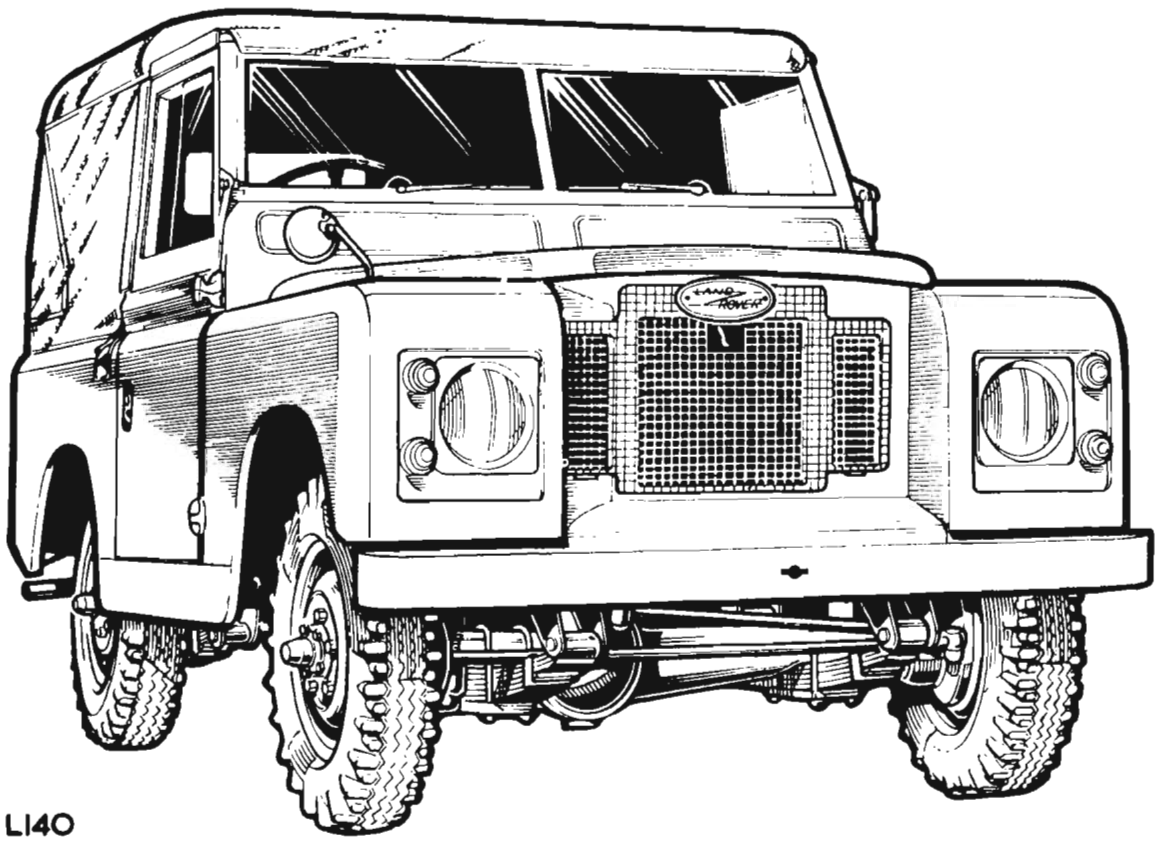
A Managing Agent for Land Rover UK Limited
Publication No LSM 64 IM

Land Rover Limited
Lode Lane
Solihull
West Midlands B92 8NW
England

A Message to the Owner . . .

Whether you are a novice or veteran, whether you are technically minded or the reverse, the Rover Company, who have built your new Land-Rover, ask you to read the following pages of this Owner's Instruction Manual.

On any correspondence with the Rover Company pertaining to this vehicle the chassis number must be quoted.



L140

Series IIA 88 'Regular', bonneted control

Series IIA 109 Station Wagon, bonneted control

Series IIA 109 'Long', bonneted control

Series IIB 110 Forward Control

IMPORTANT

As this publication is a reprint of early literature, it should be noted that where reference is made to the Rover Company this should now be taken to mean Land Rover Limited at the address given in the front of this publication.

NOTE:

Before commencing any work on the electrical equipment, check the polarity of the system to avoid the possibility of fitting unsuitable components or making wrong connections, resulting in damage.

All 2¼ litre Petrol and Diesel models up to chassis number suffix 'C' inclusive incorporates a **POSITIVE EARTH** electrical system. 2¼ litre and Petrol and Diesel models from suffix 'D' onwards, and all 2.6 litre Petrol models are equipped with a **NEGATIVE EARTH** electrical system.

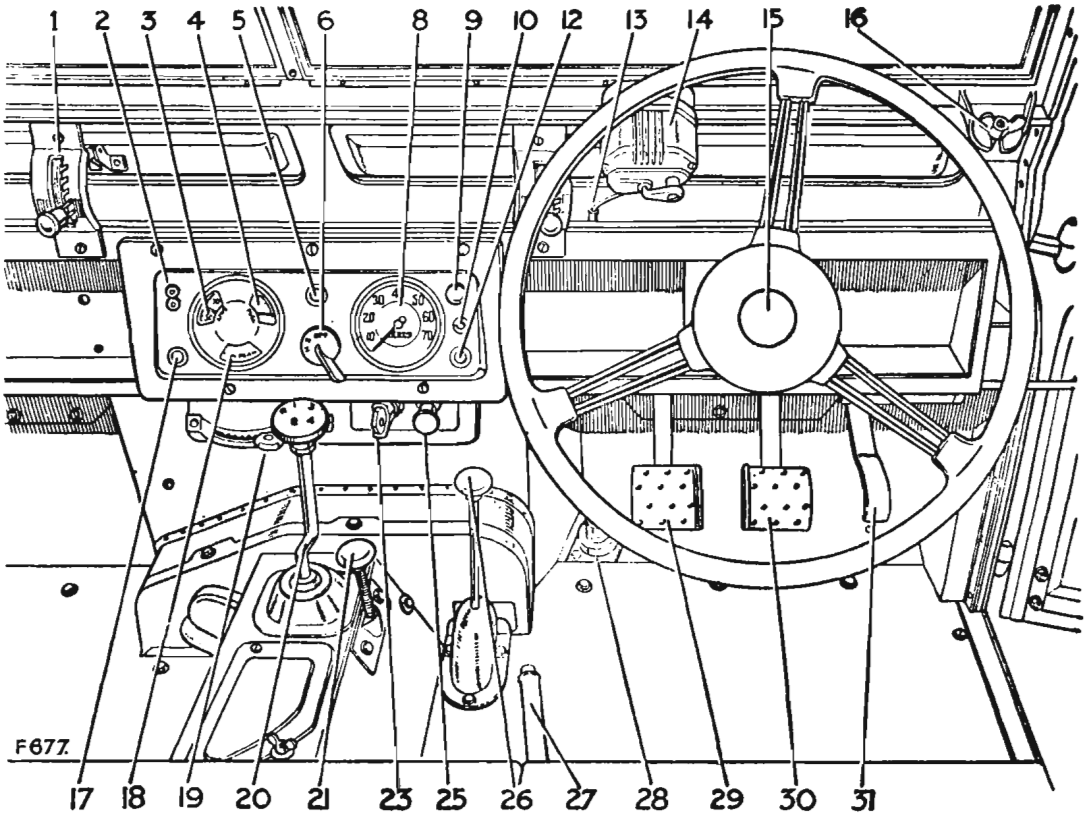
Caution: When transistorised electrical equipment, such as radios, tachometers, etc., are fitted, it is most important to ensure correct polarity of the electrical connections, otherwise the equipment may be irreparably damaged.

INDEX

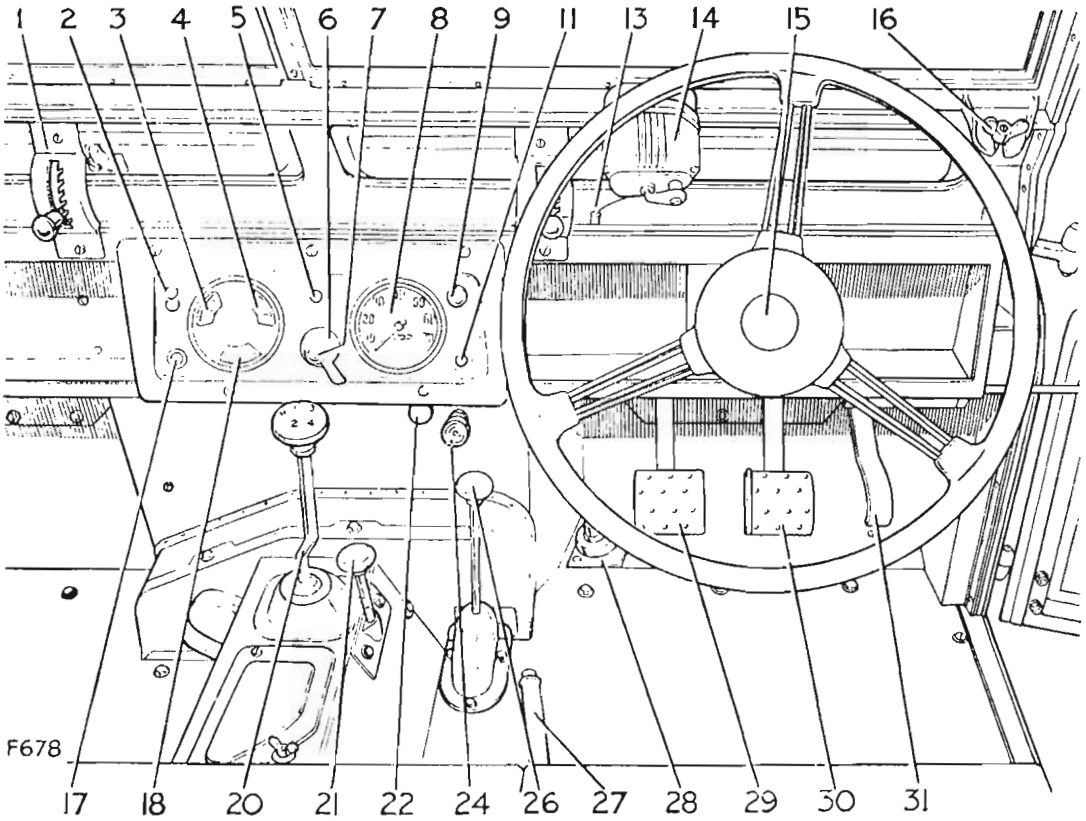
Layout of controls and instruments, 'Regular' and 'Long' Diesel models

1. Windscreen ventilators
1a. Interior light switch (optional)
2. Lead lamp socket
3. Ammeter
4. Fuel level gauge
5. Oil pressure warning light
6. Lamp switch
   (Petrol) Ignition switch
7. (Early Diesel) Electrical services switch
8. Speedometer
9. Panel light switch
10. (Diesel) Fuel tank warning light
    (Forward Control) Starter switch
11. Cold start control warning light
12. Heater plug warning light
14. Windscreen wiper
15. Horn button
16. Wingnut securing windscreen
17. Charging warning light
18. Headlamp warning light
19. Engine hand speed control
20. Main gear change lever
21. Front-wheel drive control
22. Cold start control
23. Starter, heater plug and electrical services switch
24. Starter switch
25. Engine stop control
26. Transfer box lever
27. Hand brake
28. Headlamp dipper switch
29. Clutch pedal
30. Brake pedal
31. Accelerator pedal
32. Flashers switch (Standard equipment Forward Control)

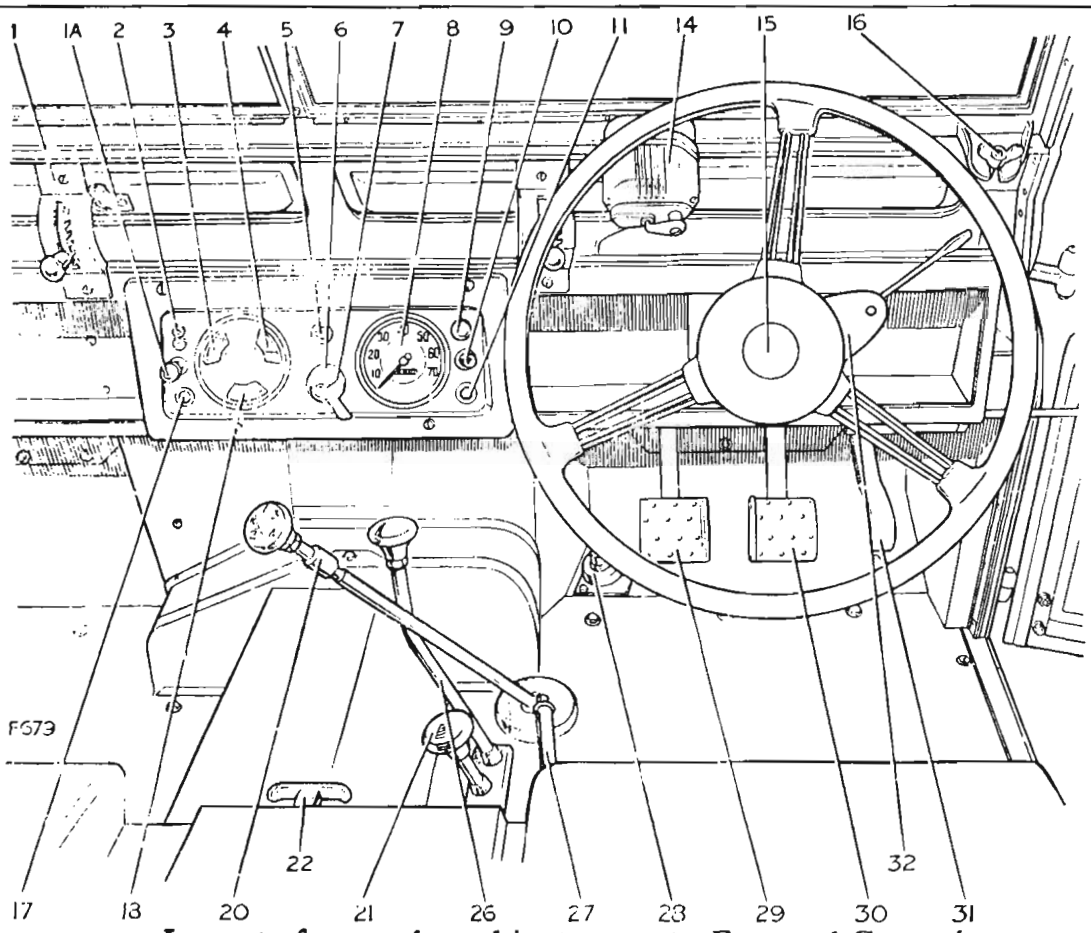
For details of the operation of the instruments and controls see following pages



Layout of controls and instruments, 'Regular' and 'Long' Diesel models



Layout of controls and instruments, 'Regular' and 'Long' Petrol models



Layout of controls and instruments, Forward Control Petrol models

IN THE DRIVING SEAT

Front seat adjustment, Long and Forward Control models

The fore-and-aft movement is adjusted by pushing to the left the lever at the left-hand side of the seat base and moving the seat into the required position. There is no seat adjustment on 'Regular' models.

Main gear change lever—black knob (1)

'Forward Control' gear levers shown at inset on illustration.
The gears are selected by means of the centrally-placed gear lever. Gear positions are marked on the knob. To engage reverse, press lever to the left against spring pressure.
Synchro-mesh gears are provided for changing from second to third and third to top, and in these cases single de-clutching may be used; for other changes it is advisable to use the double de-clutch method.

Transfer gear lever—red knob (2)

The transfer gear lever has three positions:
1. 'High' range position, fully forward. In this position the main gear lever will select the gear ratios giving normal road speeds.
2. 'Neutral' mid-way position. Used when driving power take-off equipment.
3. 'Low' range position, fully rearwards. When in this position the low range of gears will be selected by the main gear lever.

Four-wheel drive control—yellow knob (3)

When in 'High' transfer ratio, the vehicle may be operated in two-wheel or four-wheel drive as required.
The four-wheel drive control has two positions:
1. Disengaged. This position is fully up on 'Regular' and 'Long' models or lever to the right on 'Forward Control' models.
2. Engaged. Control pushed down on 'Regular' and 'Long' models, or to the left on 'Forward Control' models.

Gear changing procedures, together with illustrations of gear lever positions under various driving conditions will be found on the following pages.

Hand Brake (4)

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

Steering (5)

The steering requires only 3½ turns of the wheel from lock to lock.

Pedals (6)

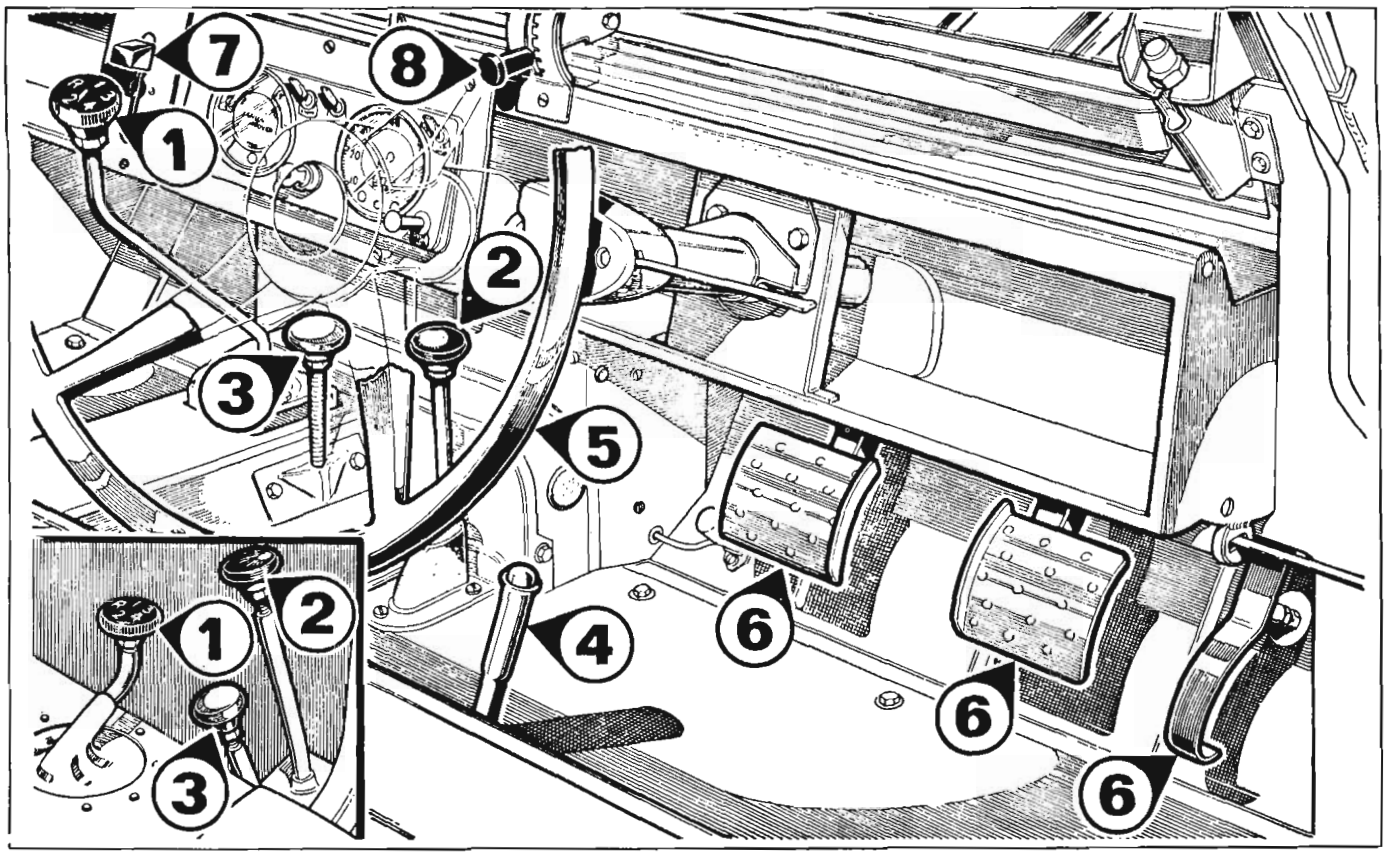
Brake, clutch and accelerator pedals are the pendant type and function in the normal way. The brake and clutch operate hydraulically, with servo assistance for the brakes on 'Forward Control','Long' 6-cylinder and 1 ton models. The accelerator pedal has a mechanical linkage.

Engine speed control (7)

Standard on Diesel, optional on Petrol models.
The quadrant of the hand control has a number of notches for the operating lever.
1. Lever down, control inoperative.
2. Move lever up to increase engine speed.

Windscreen ventilators (8)

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



GEAR-CHANGING PROCEDURE

The Land-Rover gearbox may be regarded as having 10 gear ratios; that is eight forward speeds and two reverse.
For convenience in use these gears are evenly divided into two groups, termed 'Low' range and 'High' range.
'Low' range consists of four low forward gears, plus a low reverse gear.
'High' range consists of four normal gear ratios, plus a normal reverse gear.
The two ranges may be used progressively when changing up, if conditions demand.
The charts on the following pages showing various work conditions alongside the recommended gearbox setting will be found useful until the operator has become conversant with the gearbox.

Gear levers

Three gear levers are provided to control the gearbox, these being:

1. The main gear lever, fitted with a black knob. This is used in the normal way, and will engage the five gears within the range selected by the transfer lever.
2. The transfer gear lever is fitted with a red knob and is used to select the high or low range of gears; it also has a neutral (mid-way) position.
3. The four-wheel drive control lever, fitted with a yellow knob and used to select two or four wheel drive. The use of this control is explained later.

Use of gear ranges

When selecting the low range of gears with the transfer gear lever, the gearbox will automatically engage four-wheel drive at the same time.
Therefore, when using the low gear range, the vehicle automatically provides maximum traction with maximum torque. When using the high range of gears under normal conditions, the drive is to the rear wheels only.
Should the operator encounter conditions calling for four-wheel drive in the high gear range (for example, ice or mud on the road) then this may be obtained immediately, by operating the four-wheel drive control.
As an example of how the full progressive range of the gearbox may be used, consider a vehicle which is heavily laden or towing a heavy trailer, and which is required to pull away from a standing start, up a steep gradient.
With the transfer gear lever in the low range position, the vehicle will pull away in first gear, and the gear changes for the first four gears can be made in the normal way, with the main gear lever.
When road conditions are suitable for the high gear range, they may be brought into operation without stopping the vehicle as follows:
Depress the clutch pedal, select the high range with the transfer gear lever and move the main gear lever into the second or third gear position, depending on road conditions. Release the clutch pedal and continue to change up in the normal way.
This operation can be carried out smoothly and quickly after a little practice.
By making use of the full range of the gearbox in this manner, the clutch life will not be shortened by having to compensate for the selection of an unsuitable gear ratio.

Transfer gear changing

Changing from high (lever fully forward) to low (lever fully back) transfer ratio should only be attempted when the vehicle is stationary. The engine may be left running, but the main gear lever must be in the neutral position. Depress the clutch pedal and pull the transfer lever right back; release the clutch. Should there be any hesitation in the gear engaging, do not force the lever. With the engine running, engage a gear with the main gear lever and let in the clutch momentarily; then return the main gear lever to neutral and try the transfer control again.
'Forward Control' models are fitted with an easy-change transfer gearbox; this allows the change from high to low transfer to be carried out while the vehicle is moving slowly. Changing from 'Low' to 'High' transfer ratio may be accomplished at any time, regardless of the vehicle speed. Release the accelerator pedal, depress the clutch pedal and push the transfer box lever right forward, pausing slightly in the neutral position; let in the clutch.

Operation of the four-wheel drive control

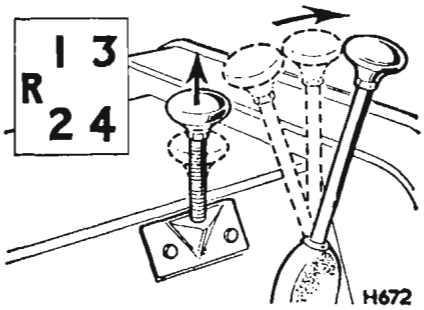
Push lever down on 'Regular' and 'Long' models, or to the left on 'Forward Control' models to engage four-wheel drive when in high transfer.
Front wheel drive in high transfer can be engaged at any time, irrespective of road speed.
However, in order to prevent excessive tyre wear, it is strongly recommended that 30mph (50 kph) should not be exceeded when using four-wheel drive in high transfer, and also that a return to two-wheel drive be made when driving conditions permit.
In order to regain two-wheel drive, stop the vehicle, move the transfer lever to the 'Low' position then back to the 'High' position. Front wheel drive will be automatically disengaged and the yellow control lever will return to the disengaged position.

General

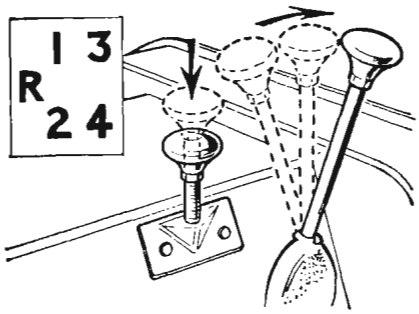
Before moving off in the vehicle after it has been parked for some time, it is a wise precaution to check that front wheel drive has not been engaged.

GEAR LEVER POSITIONS

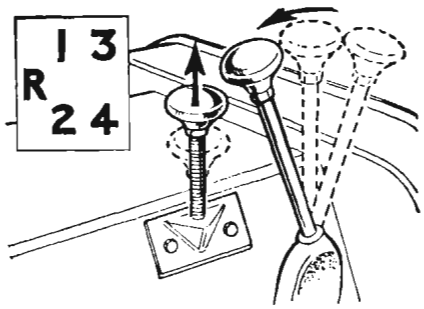
'Regular' and 'Long'



A—Normal road work

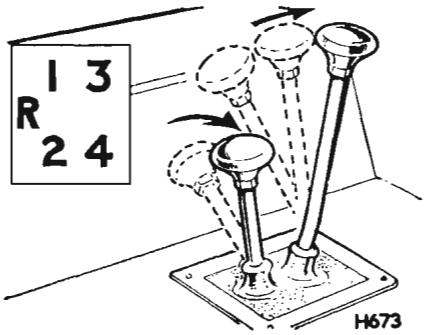


B—Hard pulling, ice, mud, grassland

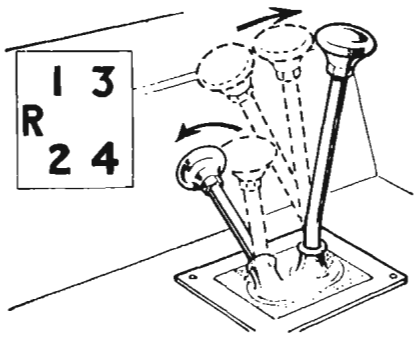


C—Heavy load pulling

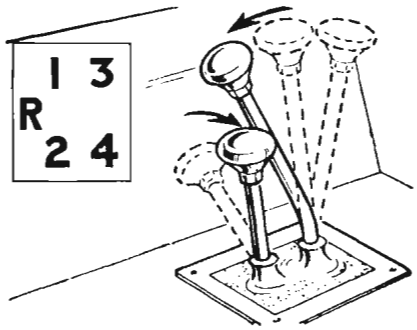
'Forward Control'



A—Normal road work



B—Hard pulling, ice, mud, grassland

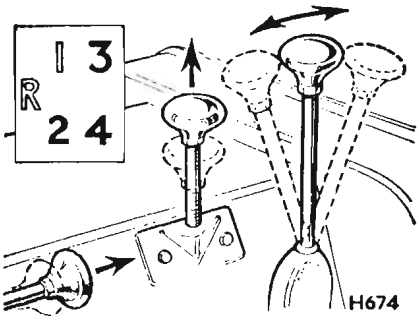


C—Heavy load pulling

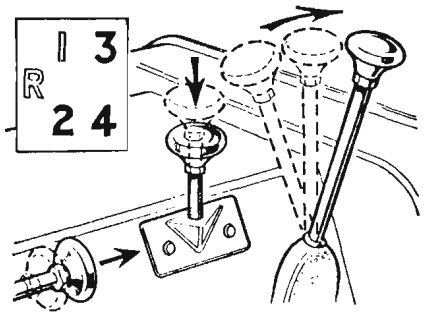
Work Conditions	CONTROL LEVER POSITION			Drive condition on vehicle	To obtain recommended drive setting	To regain normal drive setting	Remarks
	Main Gear Lever—Black	Transfer box Lever—Red	Four Wheel Drive Control—Yellow				
A—Normal road work	Select gear required	'High' position—fully forward	Disengaged	Driving rear wheels only, through the high range of gears	Check by moving transfer lever—(red) into 'Low position —fully back, and return to the 'High' position—fully forward		Check that four wheel drive is not engaged while vehicle is stationary, engine idling, and the clutch pedal depressed
B—Hard pulling on road. Ice or mud on road and grassland	Select gear required	'High' position—fully forward	Engaged	Drive on four wheels, in the high range of gears	Operate four wheel drive control (yellow) when vehicle is in motion or stationary	Stop the vehicle Select 'Low' transfer (red), then return to 'High' position	Do not exceed 30 mph (50 kph) in four-wheel drive, or excessive tyre wear will take place. Return to normal drive as soon as conditions permit
C—Very heavy load pulling Heavy ground work Ascending or descending steep gradients	Select gear required	'Low' position —Fully back	Four wheel drive is automatically engaged by selection of low transfer. Yellow control knob remains in the disengaged position	Drive on four wheels through the low range of gears	Stop vehicle, depress clutch, move transfer lever (red) to the 'Low' position —fully back	Release throttle pedal, depress clutch pedal, push transfer lever (red) forward firmly and slowly, to the 'High' position	Changing to the high gear range may be accomplished with the vehicle on the move, as soon as conditions permit

Gear lever positions

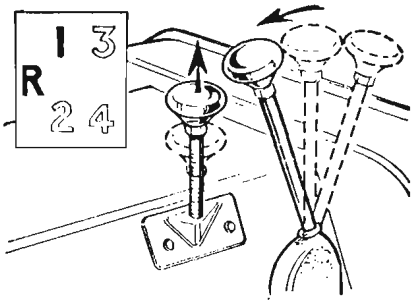
'Regular' and 'Long'



D—Driving PTO, vehicle stationary

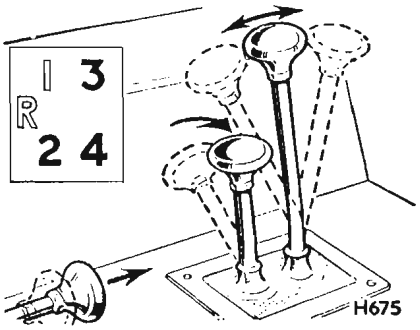


E—Driving PTO, vehicle on the move

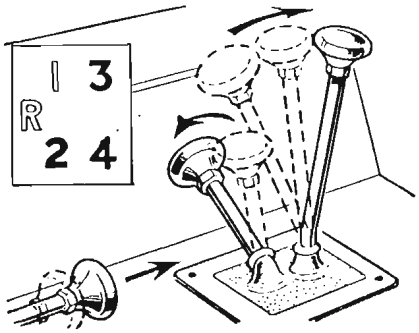


F—Parking with heavy load

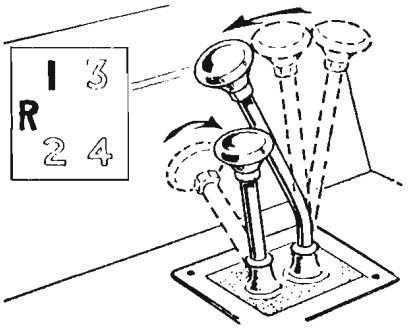
'Forward Control'



D—Driving PTO, vehicle stationary



E—Driving PTO, vehicle on the move



F—Parking with heavy load

Work Conditions		CONTROL LEVER POSITION			Drive condition on vehicle	To obtain recommended drive setting	To regain normal drive setting	Remarks
		Main gear lever—Black	Transfer box lever—Red	Four Wheel Drive Control —Yellow				
D—Driving rear and centre power take-off equipment	Vehicle stationary; (including hydraulic winching)	Third gear selected, or as conditions demand	Neutral—Mid-way position	Disengaged	No drive to any road wheels. Drive to the equipment is through the main gearbox, after engagement of the PTO selector lever	Select neutral—Mid-way position, with the transfer lever (red) and the gear required with the main gear lever. Engage the PTO selector when required	Disengage PTO selector lever, move main gear lever to neutral, and transfer lever to 'High'—fully forward	*When hydraulic winching, leave the PTO selector in the engaged position and control the winch with the 'Pay-out'—'Pay-in' control lever.
E—Driving rear and centre power take-off equipment	Vehicle on the move	Select gear required	Select 'Low' or 'High' dependent upon the RPM required by the equipment in use	Engage if required when in 'High' transfer	Two or four-wheel drive, as dictated by the nature of the work	Engage PTO selector lever and use gearbox and transfer control as conditions demand	Disengage PTO selector lever, move transfer lever into 'Low' position and back to 'High' while stationary	The use of a high gear will reduce the engine speed, and so result in an economical fuel consumption
F—Parking with heavy load on steep gradient, hand brake applied		First or reverse gear engaged	'Low' position —fully back	Four wheel drive is automatically engaged by selection of low transfer. Yellow control knob remains in the disengaged position	Stationary engine coupled to all wheels	Depress clutch and select 'Low' transfer ratio; select first or reverse, stop engine and release clutch	Depress the clutch pedal and move transfer lever into the 'High' position	Hand brake is effective on both axles in this condition

Illustration shows lever in four wheel drive, high transfer position

*These remarks do not apply to the operation of the front capstan winch, which carries its own control lever and is driven direct from the front of the engine

SECONDARY DRIVING CONTROLS

Ignition and starter switch, Petrol models (1)

The ignition switch has four positions.
1. Key upright; switch off.
2. First position to right; ignition 'on'.
3. Continuing to turn to the right, against spring pressure, operates the starter.
4. Turned to left from upright position permits the use of radio if fitted, without the ignition being switched on.

Heater plug and starter switch, Diesel models (2) *(inset on illustration)*

The heater plug and starter switch has four positions.
1. Key upright, switch off.
2. First position to right, electrical services 'on'.
3. Continue to turn the right against spring pressure operates the starter.

When key is removed (only possible in upright position) the switch cannot be operated.
The use of ether in capsules or in any other form must not be used to start the engine, as very high cylinder pressures are developed under these conditions, which can lead to serious and expensive mechanical failure.
The Land-Rover Diesel engine will start satisfactorily, with the proper use of the heater plugs down to temperatures of −4° F (−20° C) even with batteries only 70 per cent charged, provided the correct grade of oil is used.
Use heater plug position when starting from cold. For example, with a cold engine and an air temperature of 32° F (0° C) the key should be held in the heater plug position for 10 seconds.
The time required for any set of circumstances will be found with experience.

Cold start control, Petrol models (3)

When the cold start control is pulled out the mixture is progressively enriched for cold starting and the engine speed is also increased to fast idling.

After use the control must be pushed carefully in as soon as possible,consistent with even-running.
On six-cylinder models the first $8\frac{3}{8}$ in. (212.7mm) movement gives a fast idle position without enrichment of mixture. On all 'Forward Control' models, the half-way position of the cold start control, indicated by a slight click, should be sufficient to start the engine at temperatures around freezing point.
The carburetter, used on 6-cylinder models, is fitted with a cold start adjustment screw. See Owner's Maintenance Manual for setting details.

Engine stop control, Diesel models (4) *(inset on illustration)*

To stop the diesel engine, pull the engine stop control right out. This control cuts off the fuel supply to the engine. On 'Forward Control' models the control is on the heel board.

Main light switch (5)

The switch has three positions:
1. Switch in upper position: all lamps off;
2. Switch in centre position: side and rear lamps on.
3. Switch in down position: Side, head and rear lamps on.

Headlamp dipper switch (6)

The foot-operated dipper switch, situated adjacent to the clutch pedal, replaces the primary filaments in both headlamps by secondary filaments directed downwards.

Windscreen wiper switch (7)

The switch has two positions and is only operative with the ignition or electrical services switch on.
1. Switch in upper position: Wipers off.
2. Switch in down position: Wipers on.

Windscreen wiper and washer switch (where fitted) (7)

The switch has three positions and is only operative with the ignition or electrical services on.
1. Switch in upper position: Wipers and windscreen washer off.
2. Switch in centre position: Wipers on.
3. Switch in down position: Wipers and windscreen washer on.

Direction indicator switch (8)

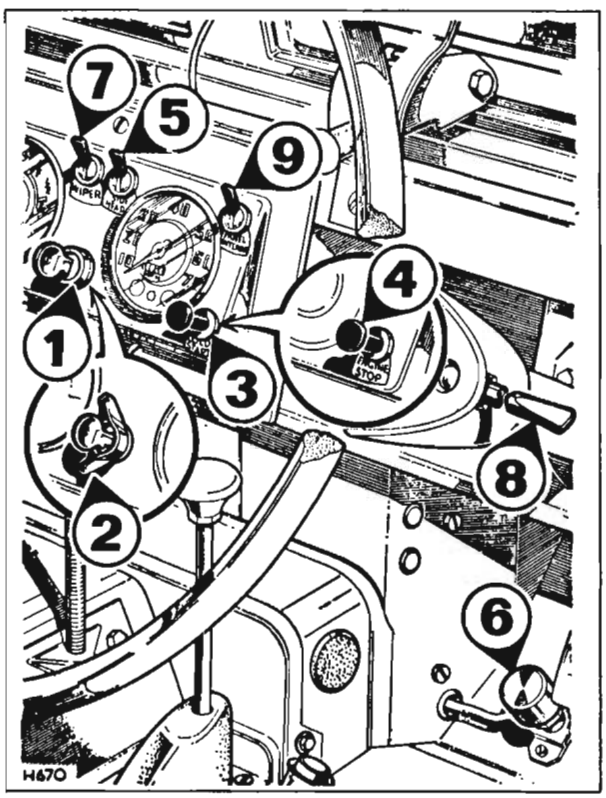
The switch has three positions and also incorporates the flasher warning light.
1. Central: switch off;
2. Up: to indicate a left-hand turn — Reversed for
3. Down: to indicate a right-hand turn — LHD models

Rapid flashing of the warning light indicates a blown bulb in one of the flasher lamps.

Panel and interior light switch (9)

The switch has three positions:
1. Switch in upper position: lights off.
2. Switch in centre position: panel lights on.
3. Switch in down position: interior lights on (where applicable).

The panel light is operative only with the mainlight switch at 'side' or 'head' position.



WARNING LIGHTS

Charging warning light (1)

The red warning light, marked 'charge' in the gauge panel, should glow when the ignition, or electrical services on Diesel models, is switched on.

Brake warning light, Forward Control' models only

The main and important purpose of the amber warning light marked 'brake' is to warn you that the fluid level in the brake reservoir is too low or that there is insufficient vaccum in the servo unit to give braking assistance.

Oil pressure warning light (2)

The green warning light marked 'oil press.' must glow when the ignition is switched on.
The charge and oil pressure lights may flicker when the engine is running at idling speed; but providing they fade out as the engine speed increases, the charging rate and oil pressure are satisfactory.
Brake, charging and oil warning lights should be checked when starting the vehicle from cold. They should light up immediately the ignition, or electrical services on Diesel models, is switched on. If any of the above lights come on during normal running, the Land-Rover should be stopped and contact made with the nearest Service Station. This is of special importance in the case of the brake warning light.

Cold start warning light (3)

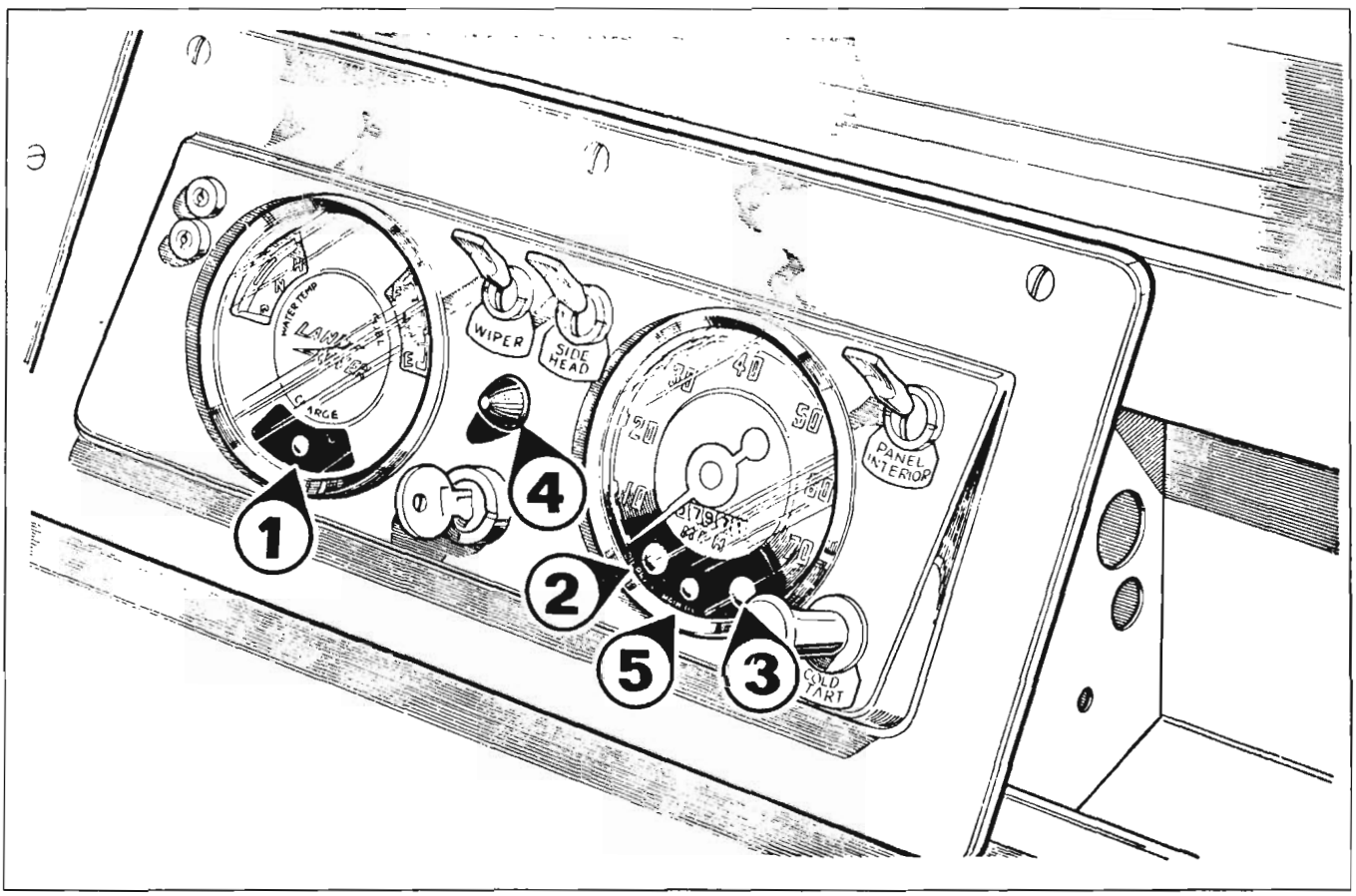
The appearance of the amber warning light marked 'cold start' on Petrol models will remind you that the choke control is still out and should be pushed in at once. On Diesel models it will glow after a delay of two or three seconds when the heater plug and starter switch is operated; this indicates that current is being passed through the heater plugs. If the warning light glows more brightly at any time, a short circuit in the system is indicated. No light will indicate an open circuit.

Fuel tank level warning light, Diesel models (4)

The blue warning light, fitted in the centre of dash on Diesel models, is operated by the fuel level gauge, and lights up when the fuel level drops below 1½ gallons (7 litres), and remains on until the fuel supply is replenished. On early models a red warning light is fitted.
Intermittent flashing may occur when cornering, before the fuel level drops below 1½ gallons.
This warning light is fitted to reduce the possibility of the driver inadvertently allowing the vehicle to run out of fuel. Should the fuel supply become completely exhausted at any time, the system must be primed.

Main beam warning light (5)

The small blue light positioned at the bottom of the speedometer marked 'main beam' glows when the primary headlamp beams are used. Its purpose is to remind you to dip the headlamps when entering a brightly lit area, or when approaching other traffic.



INSTRUMENTS

Fuel level indicator (1)

The fuel indicator shows the contents of the tank.
Total capacity is:
4-cylinder models:
10 Imperial gallons; 12 US gallons; 45 litres.
6-cylinder except Station Wagon:
11 Imperial gallons; 13 US gallons; 50 litres.
6-cylinder Station Wagon and 'Forward Control':
16 Imperial gallons; 19 US gallons; 73 litres.

Water temperature indicator (2)

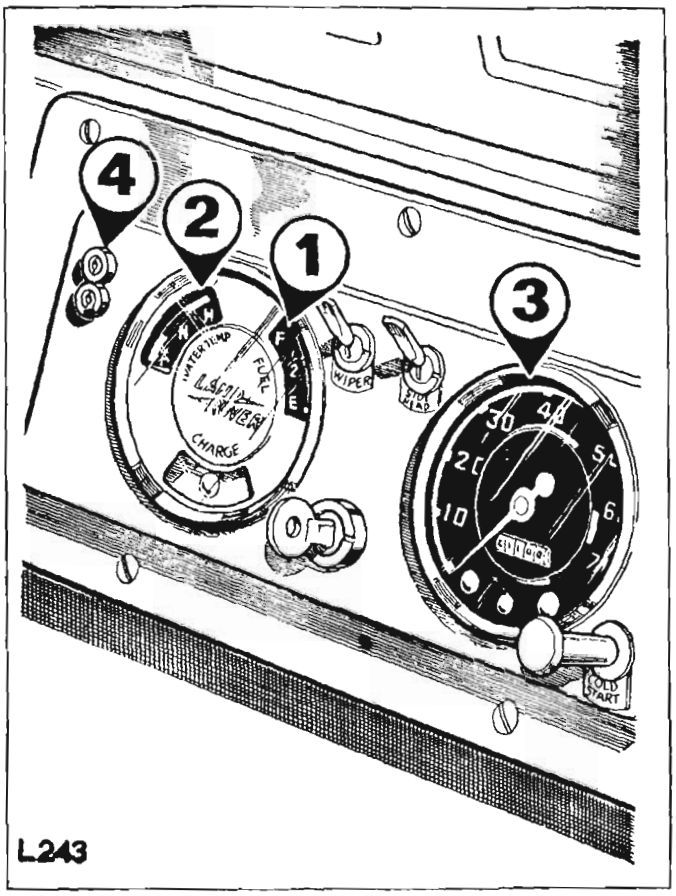
Under normal running conditions the needle should register in the band marked 'N'.
The design of the fuel level and water temperature indicators ensure that the needle does not fluctuate, but there is a time lag of a few seconds before the register after the ignition, or electrical services, is switched on.

Speedometer (3)

The speedometer incorporates a total mileage indicator. Speedometers with trip mileage indicators are available as optional equipment and have the trip reset button fitted to the instrument panel adjacent to the speedometer.

Inspection lamp sockets (4)

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



SAFETY HARNESS, EARLY TYPE

Safety harness must be fitted to the anchorage points provided at both the driver's and passenger's position to comply with United Kingdom legal requirements.

Use only Rover approved safety harness which is specially designed for the Land-Rover.

The illustrations on the next page show the initial adjustment required to suit the individual driver or passenger, and also the sequence to be followed when fastening the seat belts after the initial adjustment has been carried out.

Proceed as follows:
The layout of the safety harnes is shown at Fig. 1. Driver's side illustrated.

(A) Shoulder strap. (B) Housing strap with quick-release buckle. (C) Main adjustment buckle. (D) Tongue on shoulder strap. (E) Quick-release buckle.

Before carrying out the main adjustment on the shoulder strap, seat position must be adjusted, where applicable, to suit the occupant.

Main adjustment

1. With shoulder strap over the outboard shoulder, make visual assessment of adjustment required, tongue on strap should be about 6 inches (150 mm) from seat back rest at the hip position. Then adjust the strap of the adjustment buckle fitted to the sill bracket, by relieving the retaining bar 'A' and pulling strap in direction of arrow 'B' to shorten and in the direction of arrow 'C' to lengthen. See Fig. 2.

Day-to-day use of safety harness

To obtain the maximum designed protection from the safety harness, it is essential that it be properly fitted and adjusted.

1. With the occupant in the front seat the shoulder harness must be over the outboard shoulder. See Fig. 1.

2. Hold tongue of the shoulder strap at the hip position.

3. Hold quick-release buckle 'A', Fig. 3, at right-angles to strap then pull until buckle (A) and tongue (B) can be engaged together. See Fig. 4.

4. Then adjust by pulling end of strap 'B', Fig. 3, in direction of arrow.

   Straps should be comfortably tight, just enough to allow the hand to be passed between the upper shoulder strap and body. It is important to ensure that the lap belt is worn low so that it rests on the bony part of the hip.

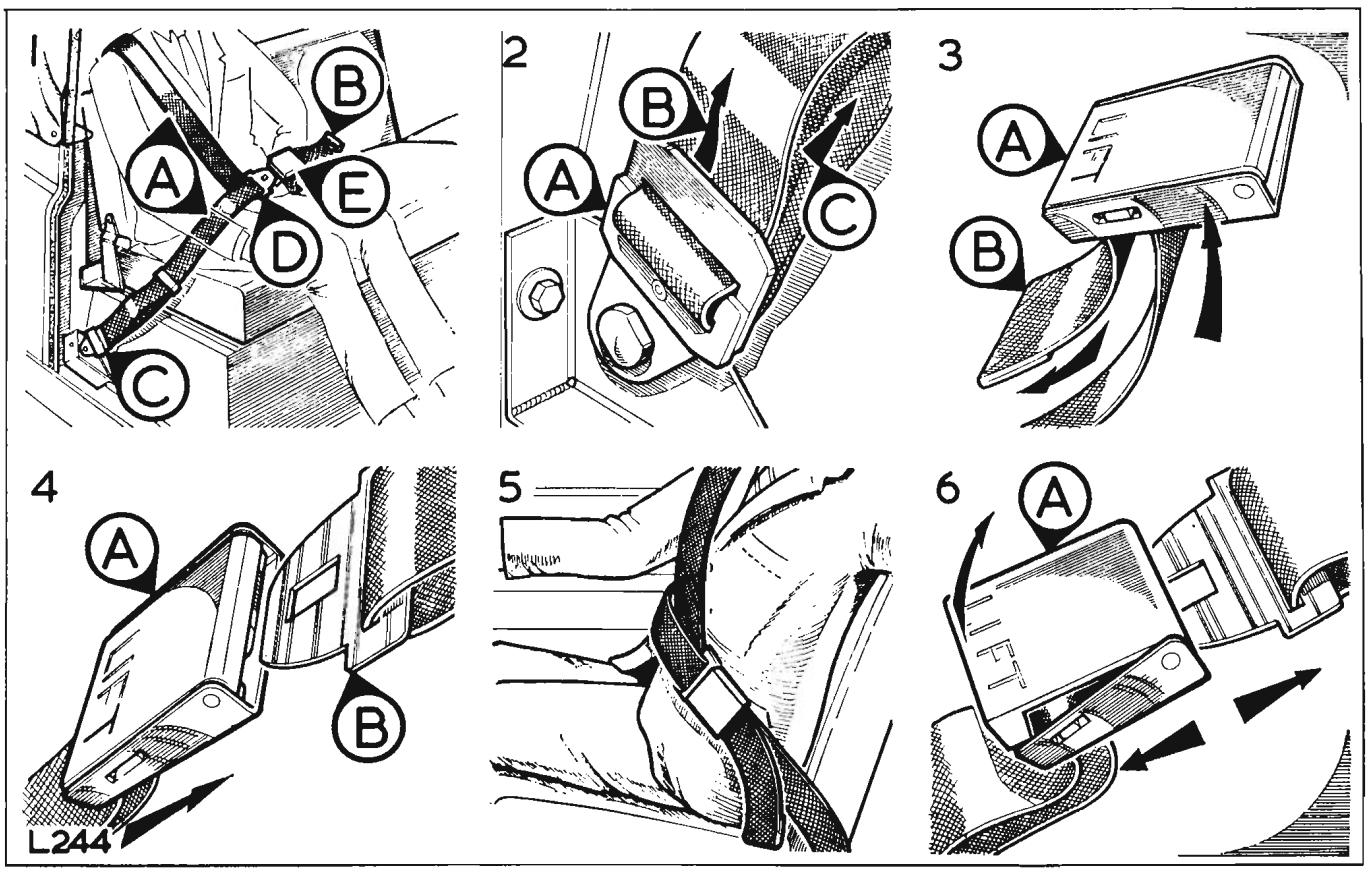
5. To undo the buckle and leave the seat, simply lift the end of buckle 'A', Fig. 6. The two sections of the harness will instantly fall apart.

   Fig. 5 shows the safety harness correctly fitted.

Safety harness which has been used in an accident or has been frayed or cut must be replaced. To avoid soiling and twisting the safety harness when it is not in use, the tongue or hooks of the shoulder strap should be stowed on the door pillar stowage.

Harness cleaning

The safety harness may be washed in hand-hot water with soap or household detergent. Do not use any other cleaning fluid.



SAFETY HARNESS, LATE TYPE

Safety harness must be fitted to the anchorage points provided at both the driver's and passenger's position to comply with United Kingdom legal requirements.

Use only Rover approved safety harness which is specially designed for the Land-Rover.

The illustrations on the next page show the initial adjustment required to suit the individual driver or passenger, and also the sequence to be followed when fastening the seat belts after the initial adjustment has been carried out.

Proceed as follows:
The layout of the safety harness is shown at Fig. 1. Driver's side illustrated.

(A) Diagonal shoulder and lap strap. (B) Short strap with quick-release buckle. (C) Main adjustment buckle. (D) Tongue on diagonal shoulder and lap strap. (E) Quick-release buckle.

Before carrying out the main adjustment on the shoulder strap, seat position must be adjusted, where applicable, to suit the occupant.

Main adjustment

1. With shoulder strap over the outboard shoulder, make visual assessment of adjustment required. Adjustment to the harness is made through the adjustment buckle on the outer strap, tightening by pulling buckle in the direction of arrow 'A' Fig. 2, or slackening by pulling buckle in direction of arrow 'B' Fig. 2. The harness should be adjusted until the release buckle on the inner strap is as far round the inner hip as possible, without actually fouling the seat.

Day-to-day use of safety harness

To obtain the maximum designed protection from the safety harness, it is essential that it be properly fitted and adjusted.

1. With the occupant in the front seat the shoulder harness must be over the outboard shoulder. See Fig. 1.

2. Hold tongue of the shoulder strap, 'B' Fig. 4, at the hip position.

3. Hold quick-release buckle 'A', Fig. 3, at right-angles to strap then pull until buckle (A) and tongue (B) can be engaged together. See Fig. 4.

4. Then adjust by pulling end of strap 'B', Fig. 3, in direction of arrow.

   Straps should be comfortably tight, just enough to allow the hand to be passed between the upper shoulder strap and body. It is important to ensure that the lap belt is worn low so that it rests on the bony part of the hip.

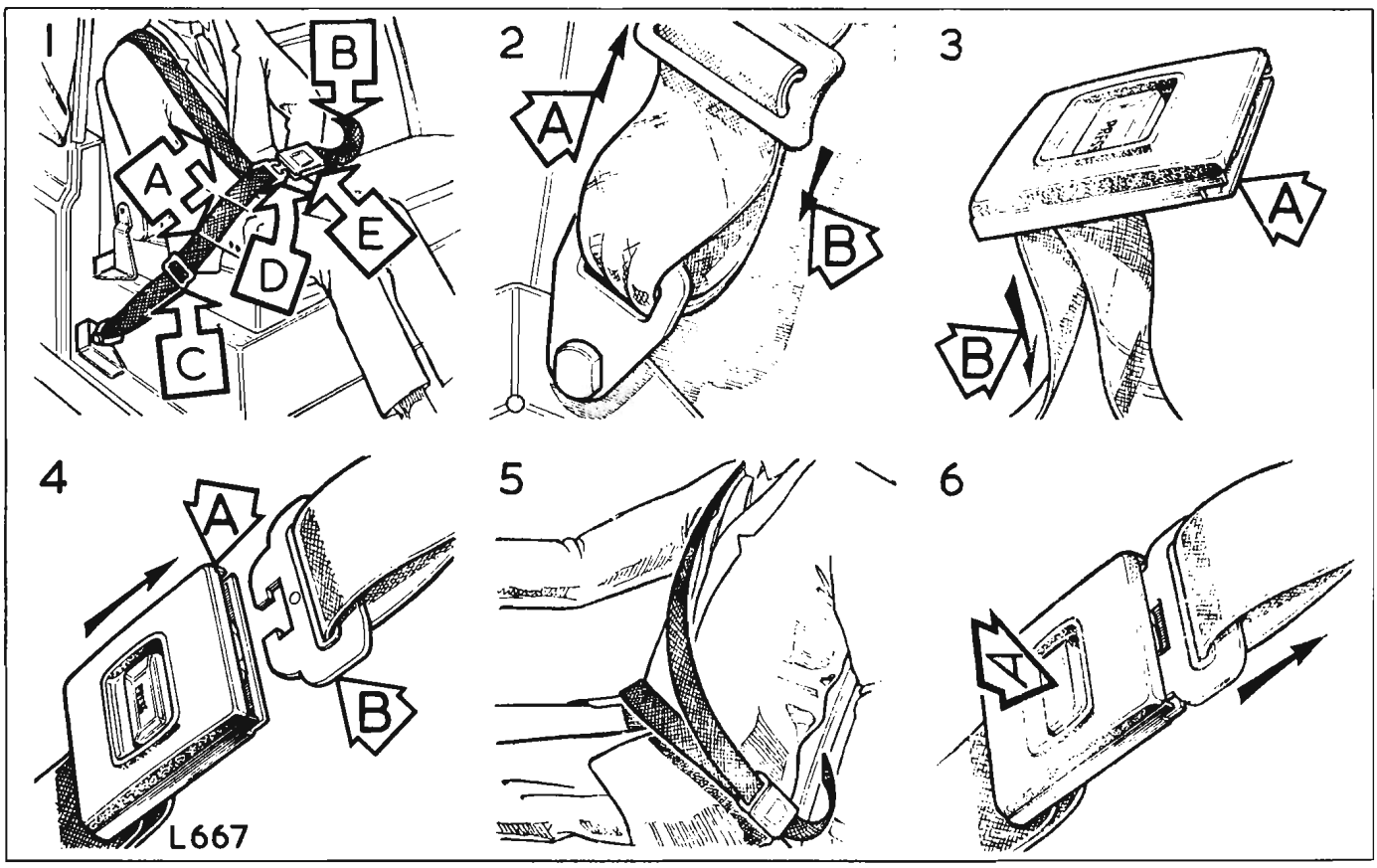
5. To undo the buckle and leave the seat, simply lean against the harness and press the release button, 'A' Fig. 6, on the buckle. The two sections of the harness will instantly fall apart.

   Fig. 5 shows the safety harness correctly fitted.

Safety harness which has been used in an accident or has been frayed or cut must be replaced. To avoid soiling and twisting the safety harness when it is not in use, the tongue or hooks of the shoulder strap should be stowed on the door pillar stowage.

Harness cleaning

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



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 6.000 km (4,000 miles) 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.

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.

Fully-illustrated details of all the maintenance required will be found in the Owner's Maintenance Manual section of this book, but you should note the following:

Running-in period

Progressive running-in of your new Land-Rover is important and has a direct bearing on durability and smooth running throughout its life.
The most important point is not to hold the vehicle on large throttle openings for any sustained period.
To start with the maximum speed should be limited to 35 to 40 mph (55 to 65 kph) on a light throttle and this may be progressively increased over the first 1,500 miles (2.500 km).

Water

A semi-sealed cooling system is used, it comprises an overflow bottle attached to the left-hand side of the radiator. The water level in the cooling system is checked at the radiator only and topping-up is also carried out in the normal manner through the radiator filler. The pipe in the overflow bottle should always be submerged in water.
The radiator water level should be checked daily or weekly depending on operating conditions.
The cooling system is pressurised and care must be taken when removing the radiator filler cap when the engine is hot; first turn it anti-clockwise to the stop and allow all pressure to escape, before turning farther 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.
Always check with a cold engine, the correct water level should then be ½ to ¾ in. (12 to 19 mm) below the bottom of the filler neck.
When engine is cold there should be about 2 in. (50 mm) of water in the bottle.

Frost precautions

As a thermostat is fitted to the cooling system it is possible for the radiator block to freeze in cold weather even though the engine temperature is quite high, for this reason the use of a good quality glycol-base anti-freeze solution must be used during cold weather.
For full details see Owner's Maintenance Manual section of this book or consult a Rover Distributor or Dealer.

Oil recommendations

Use only the recommended grades of oil as set out below. Multigrade oils produced by the makers of the lubricants listed below are also approved for the range of SAE grades they cover.
The oil level dipstick will be found on the left-hand side of the engine and the oil filler cap is at the front of the engine.
Oil consumption is likely to improve during the first 5,000 miles (8.000 km) of the Land-Rover's life as the piston rings, etc, bed in.

These recommendations apply to temperate climates where operation temperatures are above 14°F (-10°C).
Information on recommended lubricants for use under extreme winter conditions can be obtained from The Rover Company Limited, Technical Service Department, or a Rover Distributor or Dealer.

Recommended lubricants

Recommended Lubricants and Fluids — British Isles All Year Round Usage

COMPONENT	UNIPART	BP	DUCKHAMS	CASTROL	ESSO	MOBIL	PETROFINA	SHELL	TEXACO
ENGINE, PETROL HYDRAULIC WINCH SUPPLY TANK	Unipart Super Multigrade Motor Oil 15W/50	BP Super Viscostatic 20—50 BP VF7	Duckhams Hypergrade Motor Oil (15W/50)	Castrol GTX (15W/50)	Esso Superlube (10W/40)	Mobil Super 15W/40 Mobil 1 (10W/30)	Fina Supergrade Motor Oil 15W/40 or 20W/50	Shell Super Motor Oil (15W/40)	Havoline Motor Oil 15W/40
ENGINE, DIESEL HYDRAULIC WINCH SUPPLY TANK	Unipart Super Multigrade Motor Oil 15W/50	BP Super Viscostatic 20-50 or BP Vanellus C3 Multigrade 20W/50 BP VF7	Duckhams Hypergrade Motor Oil (15W/50)	Castrol GTX (15W/50) or Deusol RX Super 15W/40	Esso Superlube (10W/40) or Essolube HDX 20W/50	Mobil Super 15W/40 or Mobil 1 (10W/30) or Delvac Super 15W/40 or Delvac Special 20W/50	Fina Supergrade Motor Oil 15W/40 or Fina Delta Multigrade 20W/50	Shell Super Motor Oil (15W/40) or Shell Rotella SX 20W/40 or Rotella 20W/40	Havoline Motor Oil 15W/40 or Ursa Oil LA 15W/40 or Eurotex Motor Oil HD 20W/50
MAIN GEARBOX TRANSFER BOX FINAL DRIVE UNITS SWIVEL PIN HOUSINGS STEERING BOX, STEERING RELAY REAR POWER TAKE OFF PULLEY UNIT AND CAPSTAN WINCH HYDRAULIC WINCH GEARBOX	Hypoid Gear Oil EP90	BP Gear Oil SAE 90EP	Duckhams Hypoid 90	Castrol Hypoy SAE 90EP	Esso Gear Oil GX 85W/140	Mobil Mobilube HD 90	Fina Pontonic MP SAE 90	Shell Spirax 90EP	Texaco Multigear Lubricant SAE 90EP
LUBRICATION NIPPLES (BALL JOINTS, HUBS, PROPSHAFTS ETC.)	Multipurpose Grease	BP Energrease L2	Duckhams LB10	Castrol LM Grease	Esso Multi-purpose Grease H	Mobil Mobilgrease MP	Fina Marson HTL 2	Shell Retinax A	Marfax All-purpose Grease
WINDSCREEN WASHERS	UNIPART SCREEN WASHER FLUID — All Seasons.								
BRAKE AND CLUTCH FLUID RESERVOIRS	UNIVERSAL UNIVERSAL BRAKE FLUID or other Brake Fluids having a minimum boiling point of 260°C (500°F) and complying with FMVSS 116 DOT 3.								
ENGINE COOLING SYSTEM	UNIPART UNIVERSAL ANTI-FREEZE. If this is not available use an ethylene glycol anti-freeze (containing no methanol) with non-phosphate corrosion inhibitors suitable for use in cast iron engines to ensure the protection of the cooling system against frost and corrosion.								

Fuel recommendations

The 4-cylinder and 6-cylinder petrol engines are designed to run on 90 octane two-star fuel. No advantage will be gained by the use of higher octane fuels.
Clean, good quality fuel should be used in Diesel models.
The fuel cap is located:
'Regular' and 'Long' models: at the front right-hand side of the body.
'Long Station Wagon': at the rear right-hand side of the body.
'Forward Control' models: at the rear centre of the body.

Battery acid level

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

Tyre pressures

These should be checked every month; it is important to keep to the recommended pressures. See Data section in this book. When tyres are changed, road wheels should be carefully inspected for possible damage.

Brakes, vehicles with servo assistance

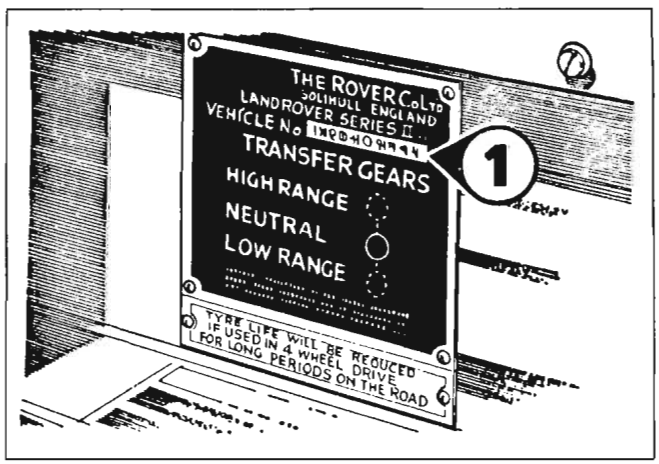
Never coast downhill with engine switched off as the brake servo will not be operative. The brakes will, however, function through the hydraulic system when the brake pedal is depressed, but more foot pressure will be required.

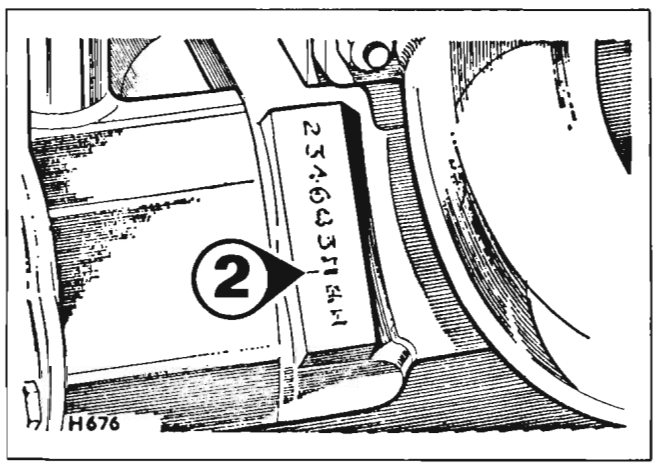
Spare wheel

The spare wheel stowage position varies on different models, as follows:
'Regular'; fitted at the front of the rear body.
'Long'; can be mounted in a well in front of either right or left wheelarch panel.
'Forward Control'; carried on the chassis, at the rear of the RH side of cab.
It can also be fitted to the bonnet top panel on all models except 'Forward Control'.

Tools

On 'Regular' and 'Long' models small tools are carried in the left-hand locker, under the seat cushion.
'Forward Control' vehicles have a tool box attached to the left-hand side of the scuttle, under the bonnet. Except on some special vehicles, the starting handle and lifting jack handle extension are secured in clips on the seat backrest panel and are accessible with the seat backs lowered.





Chassis serial number (1)

The chassis number will be found on a plate affixed to the dash panel. Always quote this number when writing to The Rover Company or your Distributor and Dealer on any matter concerning your Land-Rover.

Engine serial number (2)

The engine number is at the left front of the engine. Do not quote this number unless requested.

Important points to remember

All models:

1. Read Section Three of this book, which contains important information for the owner.
2. Use only the recommended lubricants and fuel of the correct octane rating. Two-star grade for all Land-Rover models.
3. Maintain correct tyre pressures.
4. If sparking plug or injector replacements are required, use only the correct type, as specified in the Data Section of this book.
5. Let a Rover Distributor or Dealer service your Land-Rover and use only genuine Rover parts.

Diesel models

DO

Fill the tank with *clean* fuel.

Make sure the engine stop control is right in, run position, when starting.

Depress the throttle pedal fully when starting.

Use correct grade of engine oil for prevailing climatic conditions.

Change CAV filter element regularly; also clean sediment bowl.

Always prime fuel system if any part of the fuel lines or filters are disconnected.

Eliminate air from fuel system and make sure all connections are tight.

If the engine stops without apparent reason, make sure that fuel is reaching the distributor pump.

Use a recommended grade fuel, e.g. Class A, DERV or similar.

With engine cold use heater plugs to conserve batteries.

DON'T

Allow fuel to get low in tank. Replenish when blue warning light flashes.

Allow the batteries to get in a discharged condition.

Misuse the starter switch. Wait until the engine comes to rest before each application.

Use dirty fuel. Ensure that fuel storage tanks are kept in a very clean condition and exclude dust and water.

Attempt to start the engine unless the pump is primed with fuel.

Attempt to rectify the distributor pump. Send it to the nearest CAV Agent and fit a service unit.

Allow hands and eyes to come in contact with spray from an injector nozzle, when testing.

Run engine without ensuring that the water is to the correct level in the radiator, otherwise overheating may occur with risk of nozzle sticking and other troubles.

Overtighten bolts, nuts and fuel connections.

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 (A) 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 'H' mark.

The oil level dipstick on 4-cylinder models carries three marks: 'H', 'L' and 'MIN L'. Under normal circumstances the oil level should not be allowed to fall below the minimum level mark 'MIN L'.

However, when the Land-Rover is being used at steep angles, the oil should not be allowed to fall below the intermediate mark 'L'. 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.

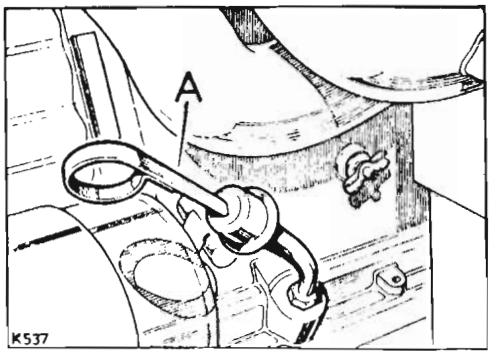


Fig. 1
Engine oil level dipstick, 4-cylinder models illustrated

Engine oil change and filter replacement—Every 6.000 km (4,000 miles) or every four months, whichever comes first

To change the engine oil:

Run the engine to warm up the oil, then stop. Remove the drain plug (A) Fig. 2 in the right-hand side of the sump. Allow the oil to drain away completely and replace the plug.

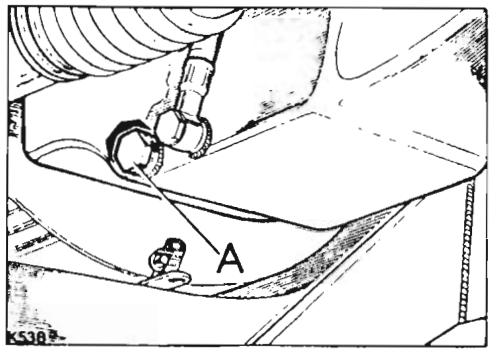


Fig. 2. Engine sump drain plug

To change filter, located at right-hand side of engine on 4-cylinder models, left-hand side on 6-cylinder models:

1. Place oil tray under engine.
2. Unscrew the bolt (D) Figs. 3 and 4 from the filter adaptor and remove the container (C) Figs. 3 and 4 and element (B) Figs. 3 and 4.
3. Discard the used filter element and large rubber washer (A) Figs. 3 and 4.
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: 6,0 litres (11 imperial pints), 12 US pints; 6-cylinder models: 5,5 litres (10 imperial pints), 11.5 US pints.

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

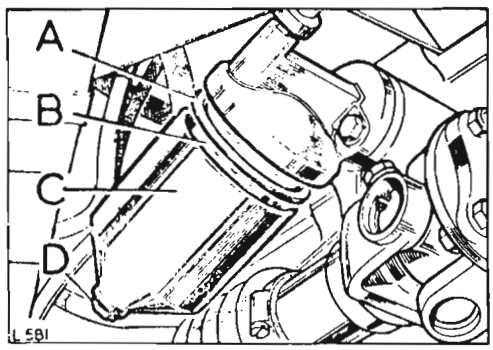


Fig. 3. Engine oil filter, 4-cylinder models

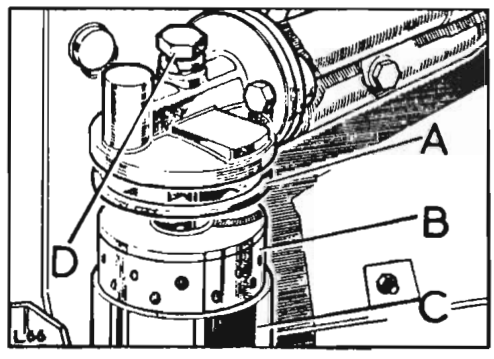


Fig. 4. Engine oil filter, 6-cylinder models

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

Clean as follows:

Remove the filters (A) and (B) 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; 4-cylinder models, replace the engine breather filter (B) with the slot facing forward and the oil filler filter (A) with the slot facing the rear of the vehicle. Models with sealed engine breather system. Connect hose to top breather.

On Forward Control 6-cylinder models the rocker cover filter is at the rear of the engine.

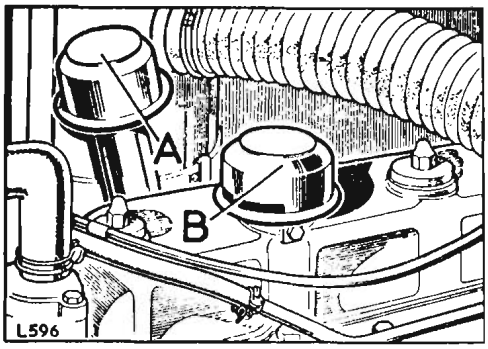


Fig. 5
Engine breather filters, 4-cylinder models illustrated

Crankcase emission control, flame-trap type (as applicable)— Every 30.000 km (20,000 miles).

Clean as follows:

1. Detach the rubber hoses (A) from each side of the flame trap (C) by compressing clips (B).
2. Withdraw flame trap.
3. Fit new flame trap and reverse removal procedure.
4. Warm up engine and re-adjust carburetter if necessary.

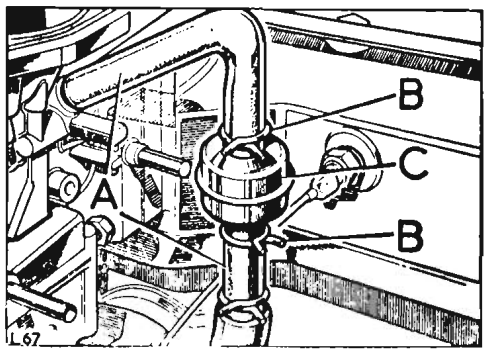


Fig. 6. Crankcase emission control, flame-trap type

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—Every 6.000 km (4,000 miles).

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.

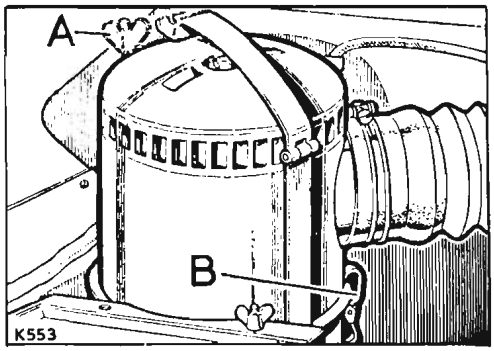
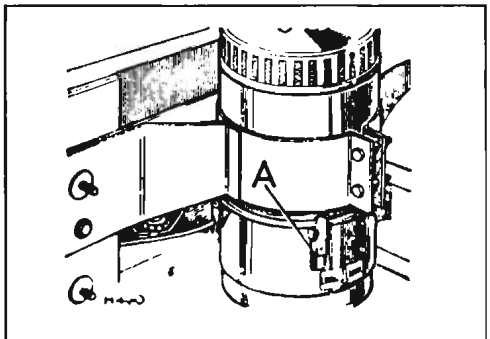


Fig. 7
Air cleaner, Regular models illustrated

For all other models, proceed as follows:

1. Slacken wing nut 'A' and 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 securing clips (B).
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 0,85 litre (1.5 Imperial pints).
4. Clean the filter in the cleaner body by swilling the complete body in petrol or paraffin and shake off the surplus.
5. Replace the bowl and refit the complete unit in the vehicle.



Air cleaner, Forward Control 6-cylinder models

A—Securing clip

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

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

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 (A) to give the correct idling speed.

2. Adjust the volume control screw (B) 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.

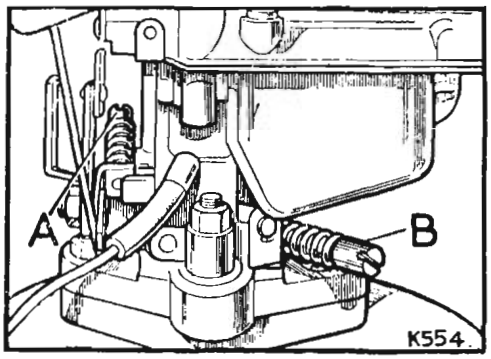


Fig 8
Carburetter slow-running adjustment, 4-cylinder Petrol models

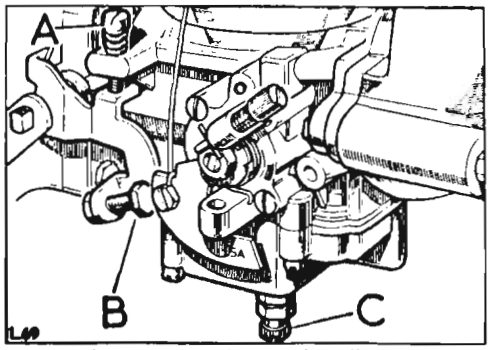


Fig. 9. Carburetter slow-running adjustment, 6-cylinder Petrol models

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

1. Run the engine until normal operating temperature is obtained. If necessary adjust slow-run screw (A) Fig. 9 to give the correct idling speed.

2. Lift the carburetter piston approximately 1 mm (0.031 in.) by means of the lift pin (A) Fig. 10 situated on the right of the carburetter body. There is approximately 5mm (0.187 in.) free movement of the lift pin before it contacts the piston.

3. If the engine speeds up immediately the mixture is too rich and the jet adjustment screw (C) Fig. 9 must be turned anti-clockwise when viewed from above, thus weakening the mixture; if the engine stops immediately, the mixture is too weak and the jet adjustment screw should be turned clockwise, again when viewed from above, to enrich the mixture.

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

   Finally adjust the slow-run screw (A) Fig.9, to get a smooth idling speed.

The fast idle screw (B) Fig. 9 should not require adjustment.

For starting at temperatures down to −18°C (0°F) push and turn the spring-loaded choke adjustment screw (B) Fig. 11 so that the peg (A) Fig. 11 is at right-angles to the slot. Leave in this position.

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

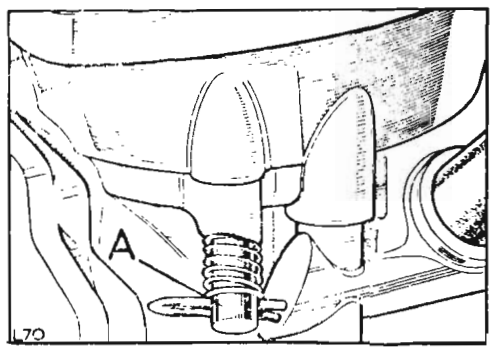


Fig. 10
Carburetter lift-pin. 6 cylinder Petrol models

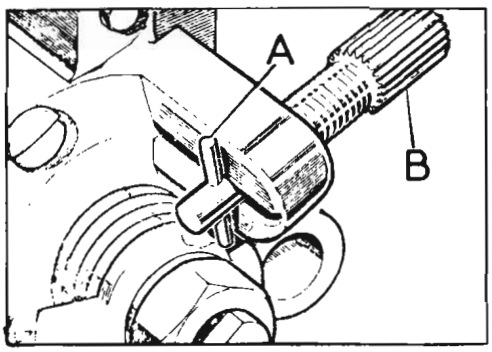


Fig. 11
Choke adjustment screw, 6-cylinder Petrol models

Carburetter hydraulic damper –Every 12.000 km (8,000 miles). 6-cylinder Petrol models

Unscrew the cap (A) on top of the suction chamber, withdraw cap and hydraulic damper, replenish the damper reservoir as necessary with SAE 20 oil to within about 12 mm (0.5 in.) from the top of the tube. Then replace cap and hydraulic damper.

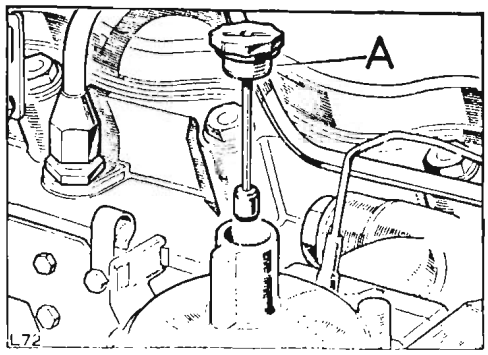


Fig. 12
Carburetter hydraulic damper, 6-cylinder Petrol models

Fuel sediment bowl and filter element –Every 18.000 km (12,000 miles). Petrol models

The fuel sediment bowl on 4-cylinder models–filter element on 6-cylinder models, provide additional means of filtration between pump and carburetter.

They are located:

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

4-cylinder models

Clean as follows:

1. Remove the bowl by slackening the thumb screw (A) and swinging the retainer aside.
2. Remove and clean filter gauze (B) in petrol.
3. Ensure that the sealing washer(C) is in good condition.
4. Replace gauze and refit bowl (D).
5. Prime by operating hand lever (E).

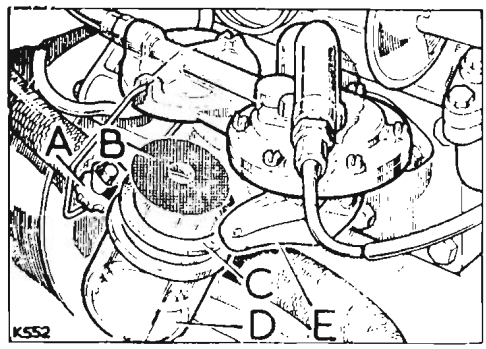


Fig. 13
Fuel pump and sediment bowl, 4-cylinder Petrol models

6-cylinder models

Replace element as follows:

1. Support element holder (B) and unscrew special bolt (C) at bottom of filter. The element holder can now be removed.
2. Remove and discard the used element (A).
3. Thoroughly clean the element holder in petrol.
4. If necessary renew the upper and lower centre seals and also the seal for the centre bolt.
5. Fit the new element, large hole uppermost, into the holder, using the seal supplied with the element.
6. Place the element holder in position and secure with the special bolt.
7. Start the engine and check for fuel leaks.

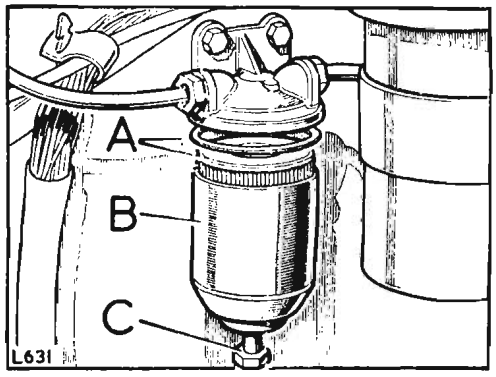


Fig. 14 Fuel filter, element type, 6-cylinder models

Fuel pump 6-cylinder Petrol models

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

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

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

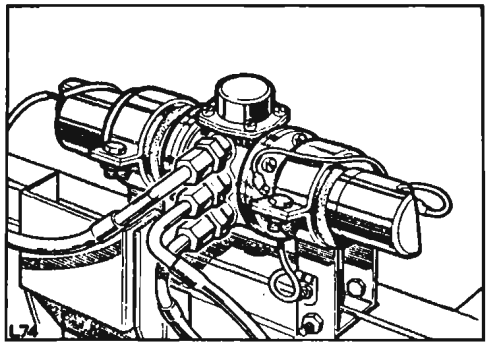


Fig. 15 Dual fuel pump, 6-cylinder Petrol models

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.

Sparking plugs —Check every 6.000 km (4,000 miles); replace every 12.000 km (8,000 miles). Petrol models

The sparking plugs are fitted with plastic covers (A) retained in the cylinder head by rubber rings. To gain access to the plugs (B) 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 0,75 to 0,80 mm (0.029 to 0.032 in.).

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

4-cylinder models 8.0:1, use Champion UN12Y
7.0:1, use Champion N8.

6-cylinder models, use Champion N5.

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

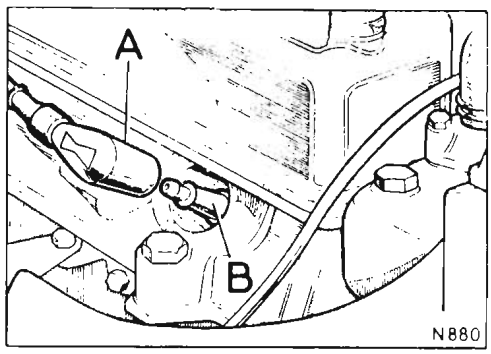


Fig. 16
Sparking plug and cover

Distributor contact points —Every 6.000 km (4,000 miles). Replace every 12.000 km (8,000 miles). 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 0,35 to 0,40 mm (0.014 to 0.016 in.) with the feeler gauge a sliding fit between the contacts.
3. If necessary, slacken the screw (B) which secures the adjustable contact and adjust by the adjuster slot (A) until the clearance is correct; re-tighten the retaining screw.
4. Replace,the rotor arm and distributor cap.

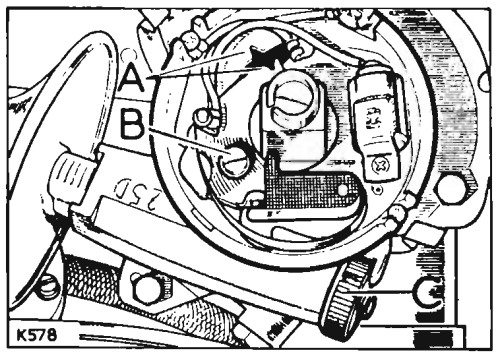


Fig. 17
Distributor contact points

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

Lubricate as follows:

1. Remove the distributor cap and rotor arm (A).
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 (B).
4. Add a few drops of thin machine oil through the side of the contact breaker base plate, to lubricate the automatic timing control (B).

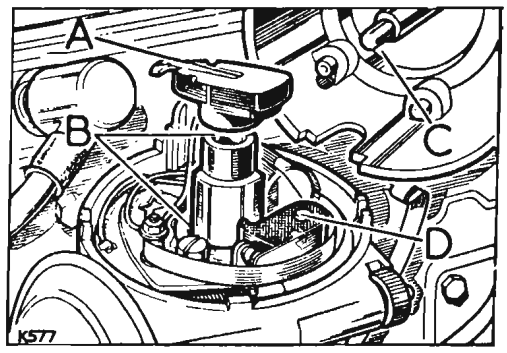


Fig. 18
Distributor

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 (D) 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 (C) works freely in its holder.

7. Replace rotor arm and distributor cap.

Ignition timing —Every 6.000 km (4,000 miles). Petrol models

In addition to automatic timing advance and retard mechanism, the distributor incorporates an adjuster screw (A); 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.

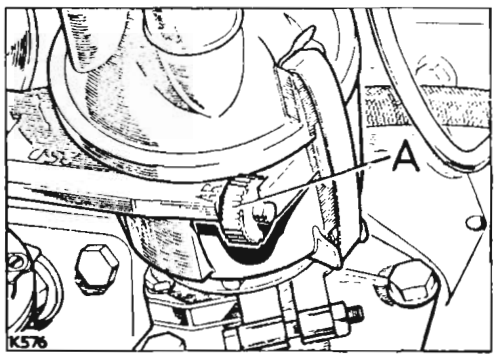


Fig. 19. Ignition timing

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

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 0,35 to 0,40 mm (0.014 to 0.016 in.) with the points fully opened.

2. 2¼ litre petrol models:
The timing marks (A), (B) and (C) represent 6° BTDC, 3° BTDC and TDC respectively.

Rotate the engine until the mark (D) on the crankshaft pulley is in line with the pointer as follows:

8.0:1 compression ratio—
TDC when using 90 octane fuel
3° ATDC* when using 85 octane fuel

7.0:1 compression ratio—
6° BTDC when using 90 octane fuel
3° BTDC when using 83 octane fuel
TDC when using 75 octane fuel

United Kingdom use two-star grade fuel

*Estimate this position on pulley

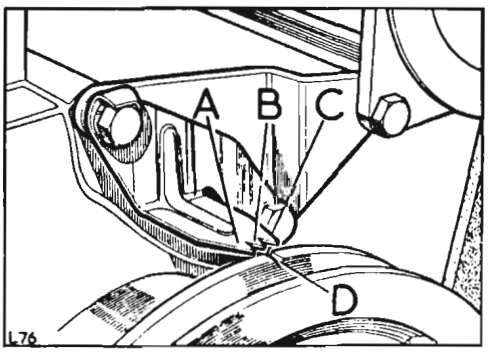


Fig. 20
Ignition timing, 2½ litre Petrol model

3. 2.6 litre 6-cylinder models:

   Rotate the engine until the appropriate mark on the crankshaft pulley is in line with the pointer (A) as follows:
   7.8:1 compression ratio—
   2° ATDC when using 90 octane fuel
   6° ATDC when using 85 octane fuel — United Kingdom
   7.0:1 compression ratio— — use two-star
   TDC when using 83 octane fuel — grade fuel
   2° BTDC when using 90 octane fuel

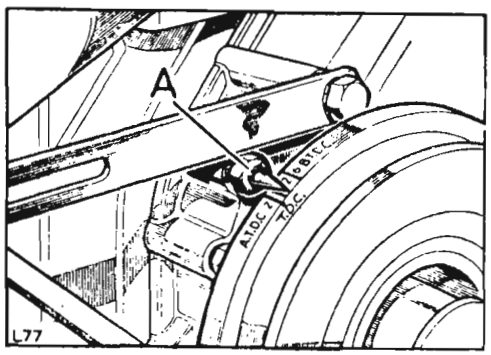


Fig. 21
Ignition timing, 2.6 litre 6-cylinder models

4. The distributor rotor will now correspond with No. 1 cylinder high tension lead terminal.

5. 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.

6. Slacken the pinch bolt at the base of the distributor head, rotate 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 leasing side of the cam; re-tighten the pinch bolt.

Fuel injectors —Check every 18.000 km (12,000 miles). 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:

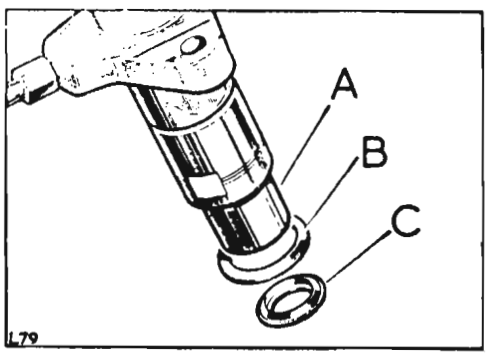


Fig. 22
Position of injector nozzle washers, Diesel models

(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 flange securing nuts.

(c) Lift out the injectors (A) complete with spill pipe and copper washers (B). Remove the steel washers (C) 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 bead, taking great care not to damage nozzle (A) and also ensure that both new copper washer (B) and steel washer (C) are fitted. The steel washer must be fitted with the 'U' of the corrugation downwards.

(e) Refit flange securing nuts.

(f) Tighten each nut alternately an equal amount to ensure that the injector goes into position evenly. The nuts must be tightened only to a torque of 0,8—1,0 mkg (6—8 lb ft). Alternatively, a 0.5 in. AF open-ended spanner of not more than 100 mm (4 in.) in length can be used. Failure to carry out the above precautions when replacing injectors may result in nozzle distortion, giving rise to rough and uneven running. Finally, tighten spill pipe banjo bolts.

Checking nozzles in engine, Diesel models

The first symptom of nozzle trouble usually comes 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 adjustments required in injectors be carried out by your nearest Rover Distributor or Dealer or CAV Agent.

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

Heater plugs, Diesel models

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

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

Fuel and injection system, Diesel models

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

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

Priming the fuel system, Diesel models

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

A— When the paper element filter is changed the system must be primed as follows:

1. Do not attempt to start the engine hoping to draw fuel through in this way, otherwise the full priming procedure will be necessary.
2. Slacken the bleed pipe on the top of the filter.
3. Operate the hand priming lever on the mechanical pump, until fuel free from bubbles emerges.
4. Tighten the bleed pipe.
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 from aperture (A).
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.

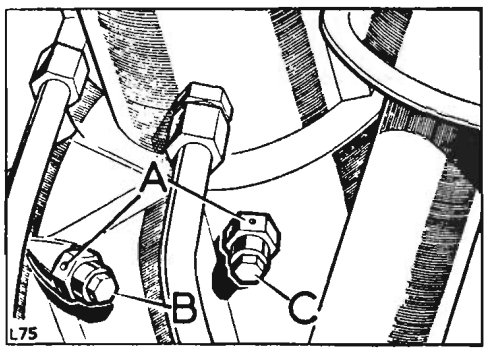


Fig. 23
Priming the distributor pump, Diesel models

C— When distributor pump only has been drained it is only necessary to carry out operations 8 to 12 inclusive.

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

Fuel filter, paper element type—Every month, drain off water; Every 18.000 km (12,000 miles) change filter element. Diesel models.

Drain off water as follows:

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

Change filter element as follows: In some instances it may be advantageous to remove the complete unit before attempting to change the filter element.

1. Support element holder (C) and unscrew the special bolt (A) on the top of the filter, the element holder can now be removed.
2. Remove and discard the used element (B).
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 special bolt.
7. Prime the system and check for fuel leaks.

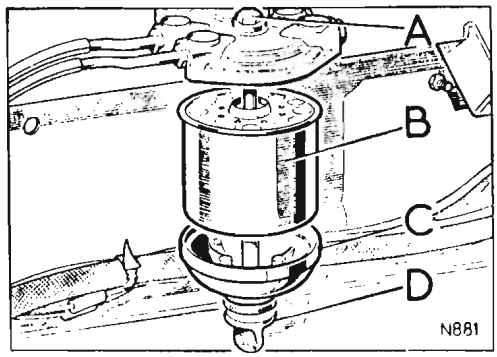


Fig. 24
Paper element filter, Diesel models

Fuel sedimeter—Every month , drain off water; every 18.000 km (12,000 miles), dismantle and clean. Diesel models

The sedimeter 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 (E) 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 inlet pipe (B) at sedimeter and raise pipe above level of fuel tank to prevent draining from tank. Support in this position.
2. Support sedimeter bowl and unscrew special bolt (A) on top of unit. The lower bowl (D) and element (C) can now be removed.
3. Clean all parts in petrol.
5. Slacken off the drain plug (E), when pure diesel fuel runs out tighten plug. Start engine and check for air leaks.

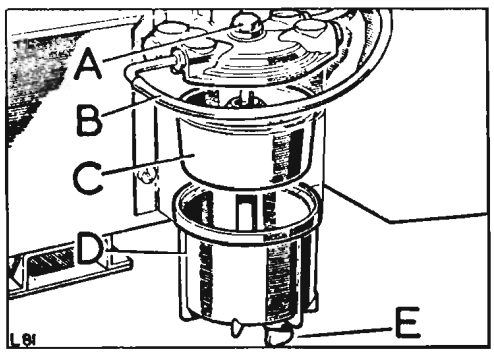


Fig. 25
Fuel sedimenter

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:

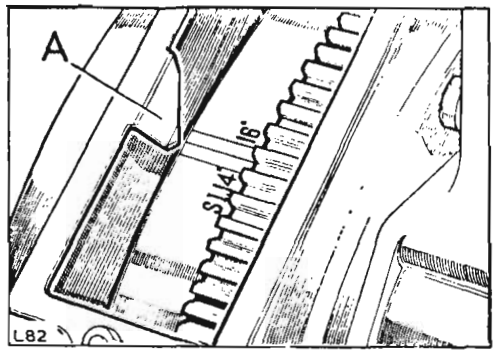


Fig. 26. Timing marks on flywheel

1. Turn 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 until the pointer (A) Fig. 26 is midway between the 14° and 16° marks, that is 15° before top dead centre. This must be done carefully. If the flywheel is inadvertently turned too far and the timing mark goes past the pointer, do not turn the flywheel back but repeat the above operation.

   Ensure that a correct line of vision is taken when lining up the timing marks. An incorrect line of vision can result in the timing being 1° to 2° out.

2. The master spline on the driving gear should now be approximately 20° from the centre line of engine measured from front end, that is, at the 4 o'clock position.

3. Insert the timing gauge (A) Fig. 27, Rover Part Number 605863, into the driving gear, then twist gauge in a clockwise direction to take up backlash and any wear in the gears. Hold this position, then, if necessary, slacken off bolts (C) Fig. 27 retaining timing pointer (B) Fig. 27 on side of cylinder block. Adjust pointer so that it coincides with the line on timing gauge.

4. Remove timing gauge.

5. Rotate driving gear on distributor pump so that master spline lines up with master spline on driving gear.

   Then offer pump to engine, ensuring that the timing mark (A) Fig. 28 on the pump flange coincides with the timing pointer (B) Fig. 28.

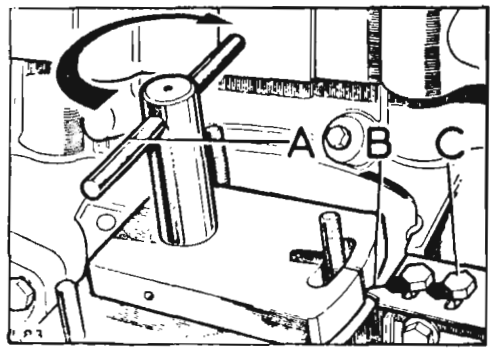


Fig. 27
Timing gauge, Rover Part No. 605863, located in driving gear

When the distributor pump is timed as detailed above, that is, with the timing pointer on the engine altered to take up backlash and wear achieved.

Should there be any fall-off of power during the life of the engine, retiming the distributor pump to take up gear wear could well make a significant improvement to engine performance, providing the engine is generally in good condition.

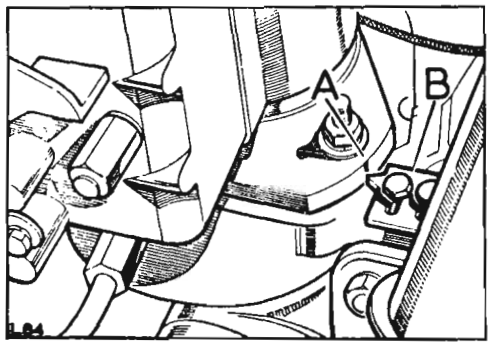


Fig. 28. Distributor pump correctly timed

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

The correct clearance is: 4-cylinder models, inlet and exhaust, 0,25 mm (0.010 in.), engine hot. 6-cylinder models, inlet 0,15 mm (0.006 in.), engine hot, and exhaust 0,25 mm (0.010 in.) 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 (C). If adjustment is required, slacken the locknut (B) and rotate the tappet adjusting screw (A) 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.

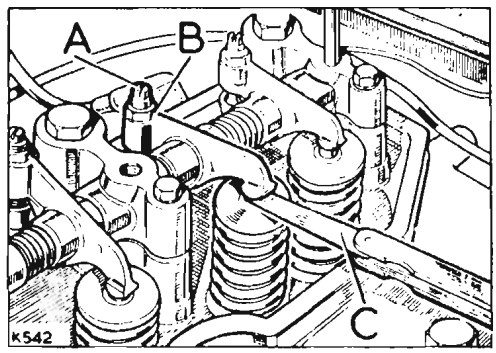


Fig. 29
Tappet adjustment, 4-cylinder models

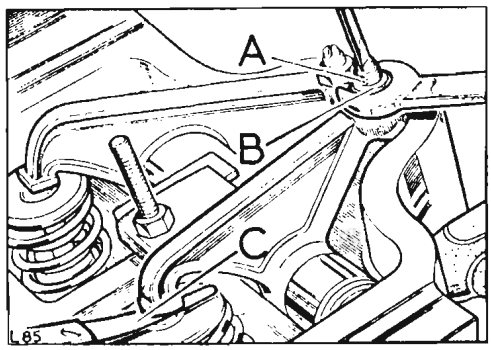


Fig 30.
Tappet adjustment, 6-cylinder models

Fan belt adjustment —Every 6.000 km (4,000 miles). All except Forward Control Diesel models.

Check by thumb pressure between the fan and crankshaft pulleys at point marked 'B'. Movement should be 8 to 11 mm (0.312 to 0.437 in.).

If necessary adjust as follows:

1. Slacken the pivot bolt (A) securing the dynamo to the mounting bracket, slacken the adjusting bolt (C).

2. Pivot the dynamo inwards or outwards as necessary and adjust until the correct belt tension at (B) is obtained.

3. Tighten adjusting and pivot bolts.

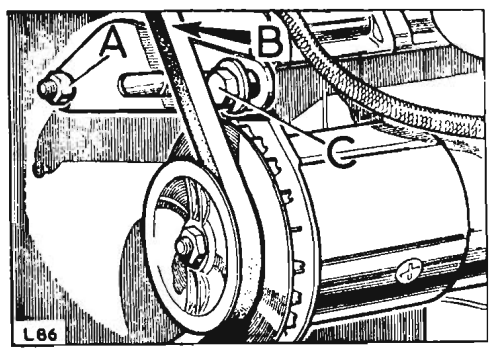
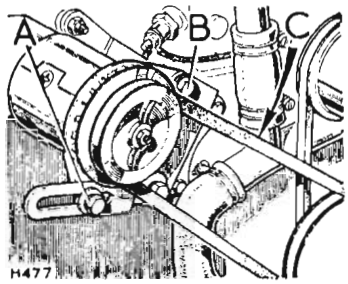


Fig. 31
Fan belt adjustment, 4-cylinder model illustrated

Dynamo belt, Forward Control Diesel models — Every 6,000 Km (4,000 Miles)

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.

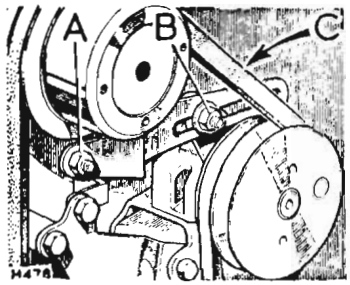


Dynamo belt adjustment, Forward Control Diesel models

A—Adjuster bolt
B—Pivot bolt
C—Check at this point, ⅛ to ¼ in. (8 to 11 mm) movement

Fan belt, Forward Control Diesel models — Every 6,000 Km (4,000 Miles)

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.



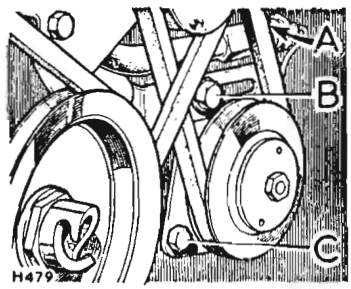
Fan belt adjustment, Forward Control Diesel models

A—Pivot bolt
B—Aduster bolt
C—Check at this point, ⅛ to ¼ in. (8 to 11 mm) movement

Exhauster belt, Forward Control Diesel models -- Every 6,000 Km (4,000 Miles)

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

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



Exhauster belt adjustment, Forward Control Diesel models

A—Check at this point ⅛ to ¼ in. (8 to 11 mm) movement
B—Adjuster bolt
C—Pivot bolt

Dynamo lubrication —Every 18.000 km (12,000 miles)

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

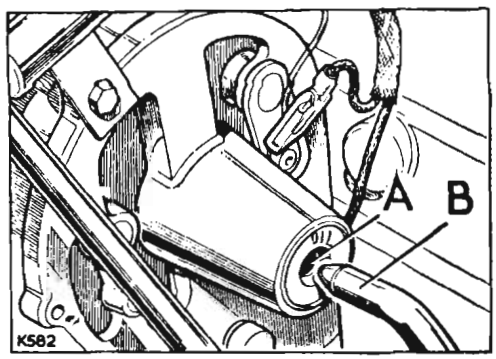


Fig. 32. Dynamo lubrication

Cooling system

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

The radiator filler cap is under the bonnet panel.

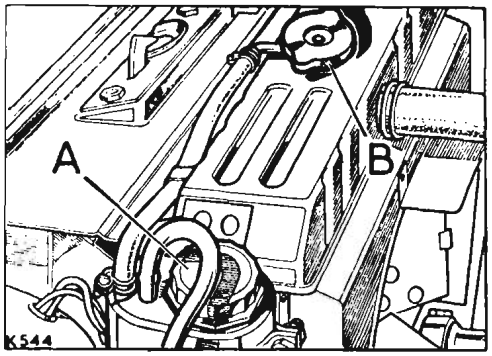


Fig. 33. Radiator filler cap

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 (B), 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.

All models have a semi-sealed cooling system, that is, an overflow bottle (A) attached to the left-hand side of the radiator.

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

With a cold engine the correct water level is 12 to 19 mm (0.5 to 0.75 in.) below the bottom of the filler neck. For capacities see Data Section.

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

Frost precautions

In cold weather, when the temperature may drop to or below freezing point, precaution 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.

When the temperature is between 0°C and minus 18°C (32°F and 0°F), use one part of anti-freeze to two 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. Drain plug (A) Fig. 34 under radiator at left-hand side and drain tap (A) Fig. 35 for cylinder block 4-cylinder at left-hand side of engine adjacent to dipstick. 6-cylinder at right-hand side of engine adjacent to engine breather.

3. Pour in approximately 4,5 litres (one gallon) of water, add solution, then top-up with water to within 12 to 19 mm (0.5 to 0.75 in.) 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 50% of anti-freeze mixture. This gives protection against frost down to minus 32°C (minus 25°F).

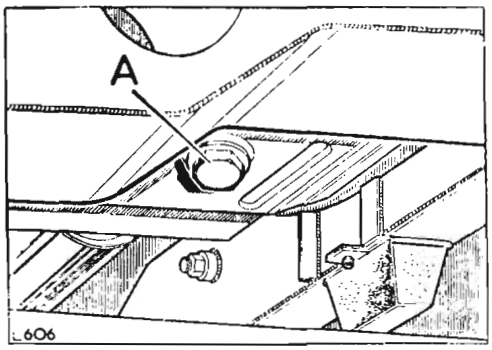


Fig. 34. Radiator drain plug

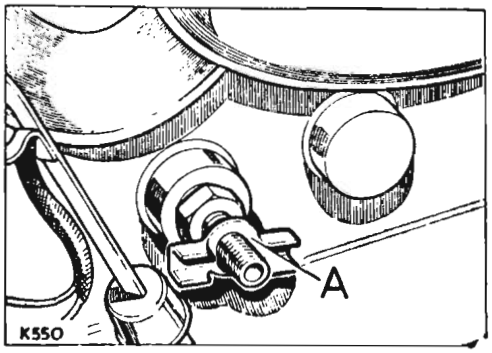


Fig. 35. Cylinder block drain tap

Main gearbox oil level—Every 6.000 km (4,000 miles)

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

The main gearbox and clutch withdrawal mechanisms are lubricated as one unit. Check oil level and top up if necessary to the bottom of the filler-level plug hole (A).

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.

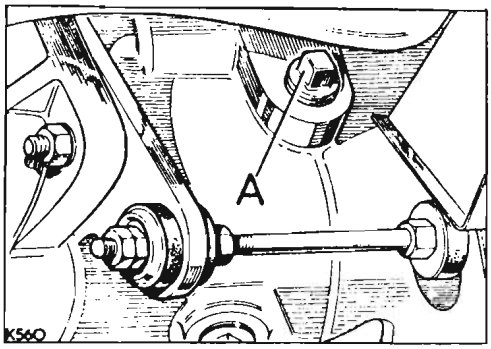


Fig. 36. Gearbox oil filler-level plug

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

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

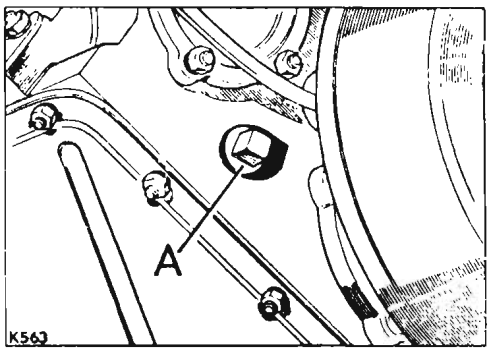


Fig. 37. Transfer box oil level

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

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

   The capacity is: 1,5 litres (2.5 Imperial pints), 3 US pints.

Transfer box oil changes —Every18.000 km (12,000 miles)

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 (B) 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 2,5 litres (4.5 Imperial pints), 5.5 US pints.

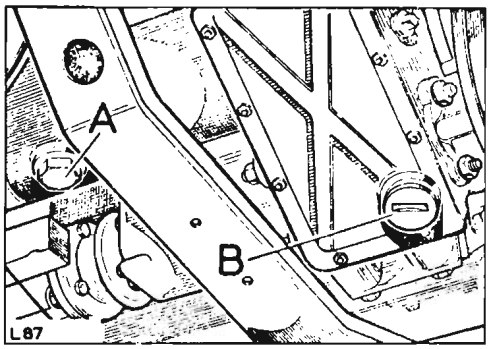


Fig. 38. Gearbox and transfer box drain plug

Flywheel housing drain plug—Every 6.000 km (4,000 miles).
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 to the bottom of the housing.

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

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

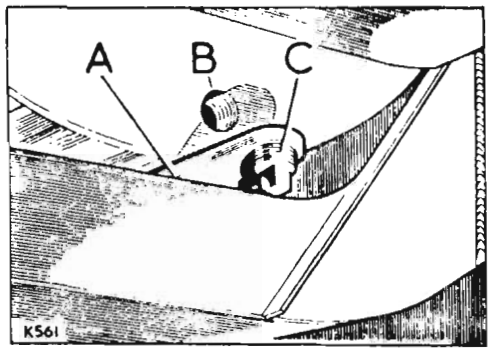


Fig. 39. Flywheel housing drain plug

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 8 mm (0.312 in.) free movement at the pedal pad, and which requires no adjustment throughout the life of the clutch plate.

Clutch fluid reservoir —Every 6.000 km (4,000 miles)

4-cylinder models have a combined brake and clutch fluid reservoir mounted on the dash, above the steering box.

On 6-cylinder models there is a seperate clutch fluid reservoir integral with the clutch master cylinder.

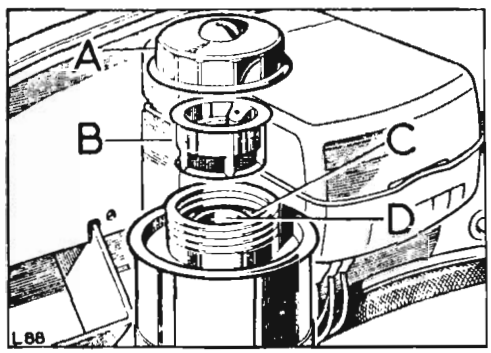


Fig. 40
Clutch and brake fluid reservoir, 4-cylinder models

4-cylinder models.

Check fluid in reservoir by removing cap (A); top-up if necessary so that fluid just shows in the bottom of filter (B).

The brake reservoir is shown at (C) and the clutch reservoir at (D).

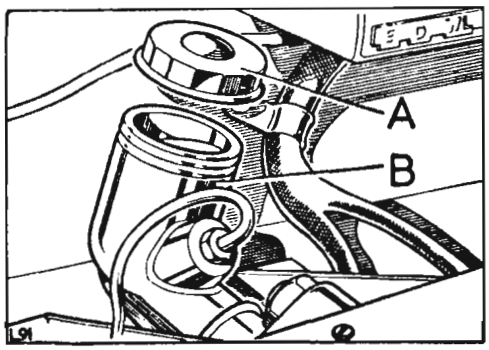


Fig. 41. Clutch reservoir, 6-cylinder models

6-cylinder models.

Check fluid level in reservoir by removing cap (A), top-up if necessary to bottom of filler neck (B).

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

Bleeding the clutch system

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

1. Attach a length of rubber tubing to the bleed nipple (A) 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 the return 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 through out the operation to prevent another air-lock being formed, using only new fluid. Note particularly that on 4-cylinder models, the fluid reservoir for the clutch is the small central tube in the combined reservoir.

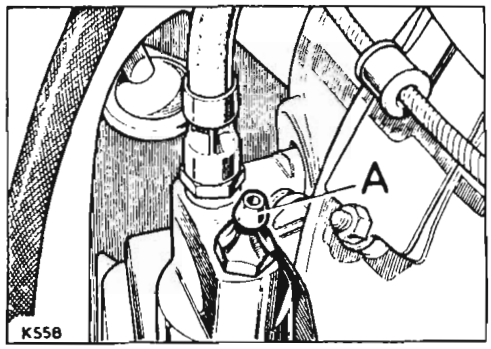


Fig. 42. Bleed nipple for clutch slave cylinder

Battery acid level —Every month and at every maintenance attention

Check weekly when operating under severe conditions.

The battery is located:

'Regular' and 'Long' Diesel models—under bonnet at right-hand side.

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

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

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

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

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

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

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

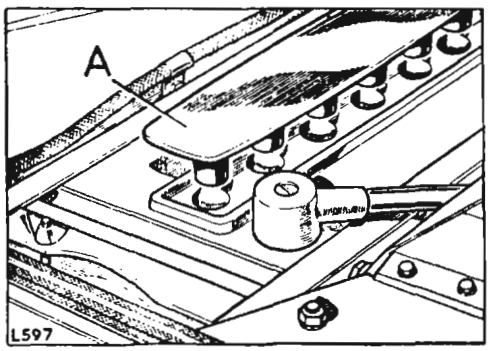


Fig. 43. Battery acid level

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

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

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

Check acid level as follows:

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

   Avoid the use of a naked light when examining cells.

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

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

Battery terminals —Every 12.000 km (8,000 miles)

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

Front and rear differential oil level—Every 6.000 km (4,000 miles)

Check oil level and top up if necessary to the bottom of the filler plug hole. The rear axle filler-level plug (A) Fig. 45 is on the right-hand side of the differential casing and the front axles plug (A) Fig. 44 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.

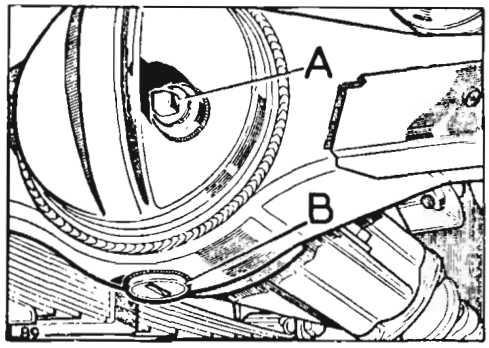


Fig. 44. Front differential oil filler-level plug

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

To change the differential oil, proceed as follows:

1. Immediately after a run, when the oil is warm, drain off oil by removing the drain plugs (B) Figs. 44 and 45 in the bottom of the axle casings.

2. Replace the drain plugs, remove filler-level plugs (A) Figs. 44 and 45 and refill with oil of the correct grade; the capacity is approximately:

   Rover type axles—1,75 litres (3 Imperial pints), 3.5 US pints.
   ENV type axles—1,4 litres (2.5 Imperial pints), 3.0 US pints.
   The drain plugs have slotted heads and can be removed with the aid of the single-ended spanner in the tool kit.

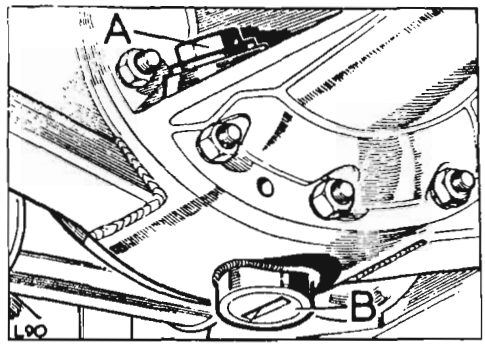


Fig. 45. Rear differential oil filler-level plug

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

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 (A) at the rear of the housing.

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

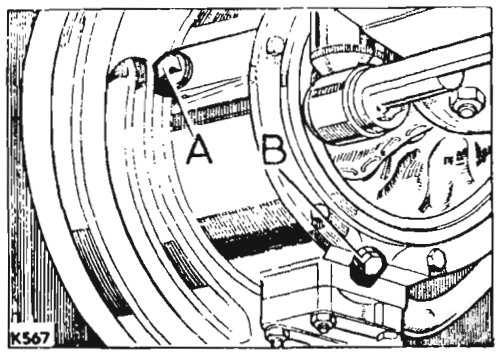


Fig. 46. Swivel pin housing oil filler-level plug

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

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

Immediately after a run, when the oil is warm, remove the drain plug (B) 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 (A); the capacity of each housing is approximately 0,5 litre (1 Imperial pint), 1.2 US pints.

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

Check oil level and top up if necessary to the bottom of the filler-plug hole (A) 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.

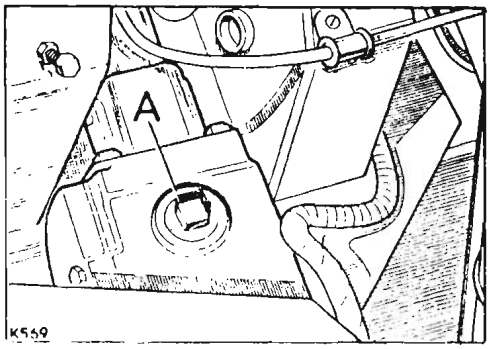


Fig 47. Steering box oil filler plug

Steering ball joints —Every 6.000 km (4,000 miles)

Check rubber boots daily when operating under arduous conditions.

The steering joints (A) 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 boots have not become dislodged or damaged, and check for wear in the joint.

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

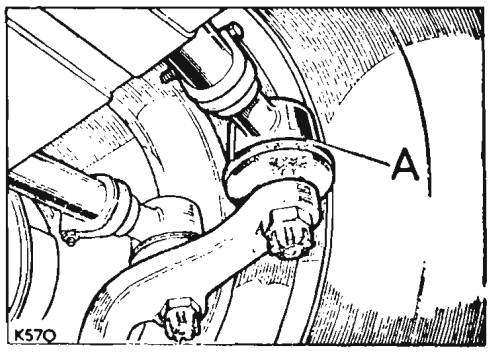


Fig. 48. Ball joints

Steering relay unit —Every 6.000 km (4,000 miles)

Bonneted control models only.

Check oil level and top-up if necessary until the oil is visible at the base of the filler and breather holes. If significant topping-up is required, check joints for leakage and fit new joint washers as necessary. To check oil level and top up, proceed as follows:

1. Remove the name plate (A) and withdraw radiator grille (B), Fig. 49.
2. Remove two of the bolts (C) securing the relay top cover (D), Fig. 50.
3. Using one of the holes as an oil filler (the other acting as a breather hole) fill the relay unit with the correct grade of lubricating oil to the bottom of the filler hole. See Data section for recommended lubricants.
4. Whilst filling, it is probable that oil will eject through the breather hole. If this occurs *do not* assume that the relay unit is full. Time must be given to allow the oil to find its way to the main chamber. Wait a few moments until the breather hole is clear of oil, then continue filling.
5. As the unit fills up, air is forced out usually in the form of an oil bubble, escaping through the breather hole, again giving the impression that the unit is full. Wait for the bubble to subside, then continue filling in this manner until the oil is clearly visible at the base of the filler and breather holes.
6. Replace the two top cover bolts.

Refit the radiator grille and name plate.

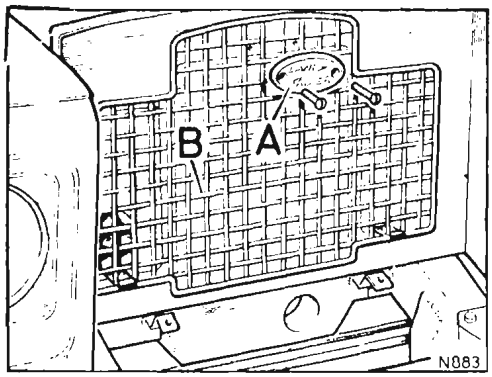


Fig. 49. Radiator grille

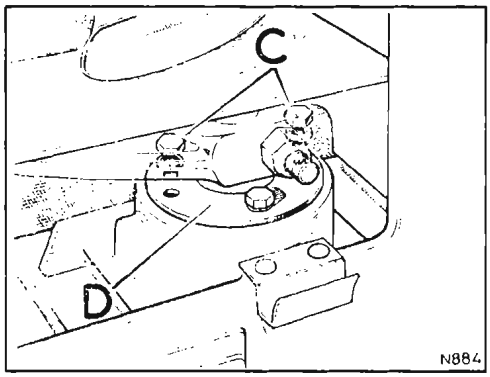


Fig. 50. Steering relay unit

Wheel alignment –Every 6.000 km (4,000 miles)–Fig. 51

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

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

To adjust

1. Set the vehicle on level ground with the road wheels in the straight ahead position and push it forward a short distance.

2. Slacken the clamps (B) securing the ball joints (A) at each end of the track rod.

3. Turn the track rod (C) to decrease or increase its effective length as necessary until the toe-in is correct.

4. Push the vehicle rearwards turning the steering wheel from side to side to settle ball joints, then with the road wheels in the straight ahead position, push the vehicle forward a short distance.

5. Recheck the toe-in, if necessary carry out further adjustment.

6. When the toe-in is correct, lightly tap the track rod ball joints towards the rear of the vehicle to the maximum of their travel. This ensures full unrestricted movement of the track rod. Then secure the ball joint clamps.

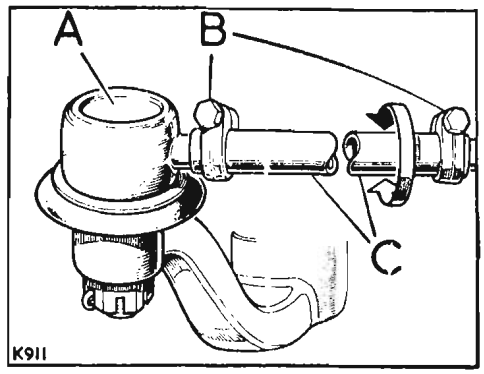


Fig. 51. Track rod adjustment

Brakes

Brake system

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

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

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

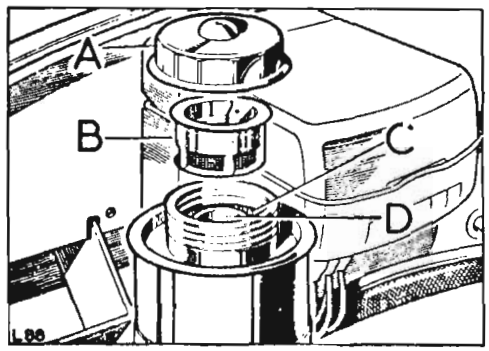


Fig. 52
Brake and clutch fluid reservoir, 4-cylinder models

Brake fluid reservoir—Every month and at every maintenance inspection

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

6-cylinder models. The brake reservoir is mounted above the master cylinder.

4-cylinder models, Fig. 52

Check fluid level in brake reservoir by removing cap (A), top up if necessary so that fluid just shows in bottom of filter (B). Make sure that the brake reservoir (C) and on 4-cylinder the clutch reservoir (D) are topped up.

6-cylinder models, Fig. 53

Check fluid level in brake reservoir by removing cap (A), top up if necessary. Do not let fluid level fall below the 'DANGER' mark (B).

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

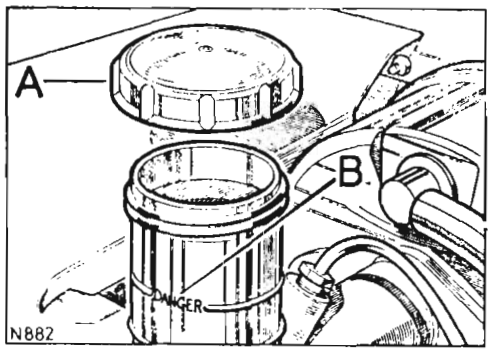


Fig. 53
Brake fluid reservoir, 6-cylinder models

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

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:

'Regular' Models

1. Jack up each wheel in turn.

2. On the back face of the brake anchor plate will be found a hexagon adjustment bolt (A), which operates a snail cam bearing on the leading shoe. Only one of these is fitted to each brake wheel unit, thereby providing single-point adjustment.

3. Spin the wheel and rotate the adjuster bolt until the brake shoe contacts the drum, then ease the adjuster until the wheel again rotates freely.

4. Repeat for the other three wheels.

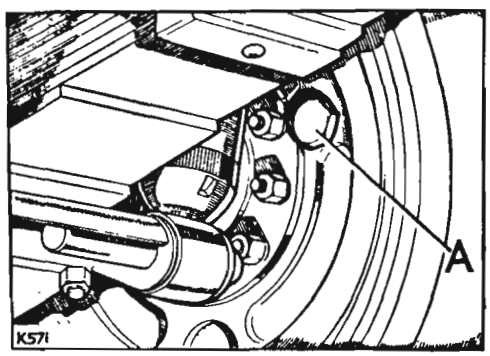


Fig. 54. Wheel brake adjustment

'Long' and Forward Control Models

5. Each shoe is independently set by means of a hexagon adjustment bolt (A) operating through a serrated snail cam.

6. Apply the brakes and set the snail cam adjusters so that the brake shoes are in firm contact with the drums.

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

8. Repeat for the other wheels in turn.

Note: The rear brake shoes should be adjusted individually to obtain the best results.

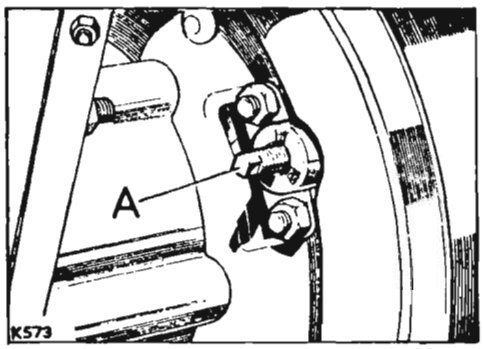


Fig. 55. Transmission brake adjustment

Transmission brake adjustment—Every 6.000 km (4,000 miles)

If hand brake movement is excessive, adjust as follows;

Release the hand brake. The adjuster (A) protrudes from the front of the brake backplate and is accessible after removing the centre seat box panel. 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.

Bleeding the brake system

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

1. Slacken the adjusters off on all brake shoes.

2. Forward Control and 6-cylinder 'Long' models. Bleed the servo unit in a similar manner as detailed for the wheel cylinders.

3. Attach a length of rubber tubing to the bleed nipple (A) 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.

7. Re-bleed the servo unit.

8. Pump brake pedal until rear shoes are in firm contact with the brake drum.

9. While holding pedal depressed, adjust rear adjusters up to the shoes.

10. Release pedal and slacken rear adjusters until shoes are just clear of the drums.

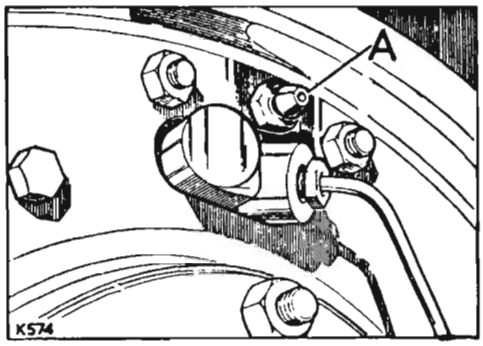
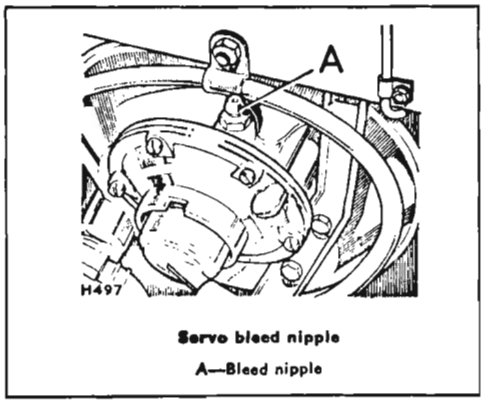


Fig. 56. Brake bleed nipple



Servo bleed nipple

A—Bleed nipple

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.

Note particularly that the fluid reservoir for the brakes on 4-cylinder models is the outer portion of the combined reservoir.

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

Fluid changing, brake system —Every eighteen months.

All the fluid in the brake system should be changed every eighteen months. It should also be changed before touring in mountainous areas if not done in the previous nine months.

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

Rubber seals in brake system —Every 64.000 km (40,000 miles)

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 64.000 km (40,000 miles). Refill with correct fluid.

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

Changing wheel positions —Every 6.000 km (4,000 miles)

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.

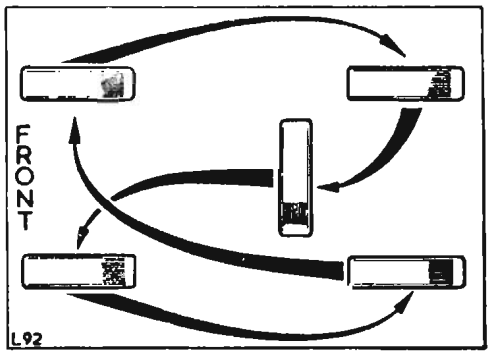


Fig. 57 Changing wheel positions

At the same time inspect the tyre tread. Minimum tread depth must be at least 1 mm throughout at least three-quarters of the breadth of the tread and round the entire outer circumference of the tyre.

Check also for cuts, lumps and bulges and exposed ply or cord structure.

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

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

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

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

Propeller shaft

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

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

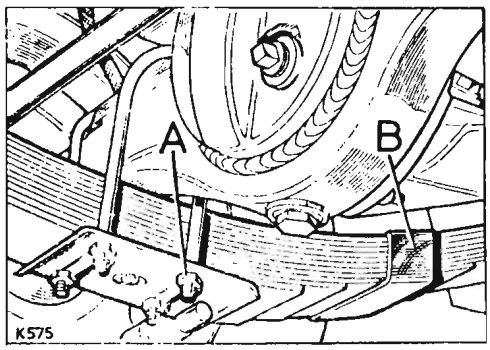


Fig. 58. Road springs

Propeller shaft lubrication —Every 6.000 km (4,000 miles)

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

Front propeller shaft sliding portion —Every 36.000 km (24,000 miles)

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.

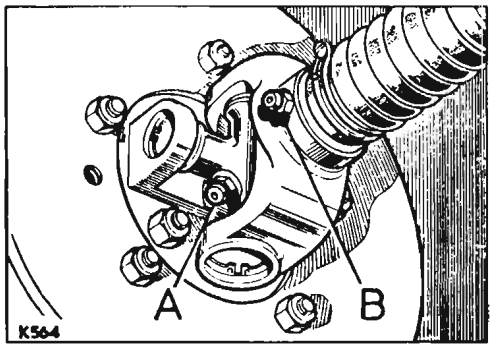


Fig. 59. Propeller shaft lubrication

Headlamp beam setting

Headlamp beam setting —Every 12.000 km (8,000 miles)

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

Oilcan lubrication—Every 12.000 km (8,000 miles)

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

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 6.000 km (4,000 miles) 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. Diesel models. Every month drain water from fuel filter and fuel sedimenter.

6. 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.

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

AT 1.500 KM (1,000 MILES)

Free service

AT 6.000 KM (4,000 MILES)

Drain and refill engine.
Forward Control models: Lubricate fan drive shaft.
Renew external oil filter.
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 fan belt adjustment.
Check water level in radiator.
Check gearbox and transfer box oil level.
Drain flywheel housing, when drain plug is fitted.
Check fluid level in clutch reservoir.
Check battery acid level and specific gravity of electrolyte.
Check oil level in differentials.
Check oil level in front swivel pin housings.
Check hubs for leakage.
Check oil level in steering damper unit.
Check rubber boots on steering joints.
Check wheel alignment.
Check fluid level in brake reservoir.
Check and, if necessary, adjust brake shoes.
Check and, if necessary, adjust handbrake shoes.
Change round all road wheels.
Check tyre pressures and inspect tyre treads.
Lubricate propeller shafts.
Road test.

AT 12.000 KM (8,000 MILES)

As 6.000 km (4,000 miles) plus
Clean breather filters.
Petrol models: 6-cylinder: oil carburetter hydraulic damper.
Petrol models; Replace sparking plugs.
For service replacements use only:
4-cylinder models,
8.0:1 compression ratio. Champion UN 12Y.
7.0:1 compression ratio. Champion N8.
6-cylinder models,
Champion N5.
Check tappet clearance.
Clean, grease and tighten battery terminals.
Check headlamps beam setting.
Check lights and instruments for correct operation.
Oil throttle linkage joints, door locks and hinges, hand-brake linkage, bonnet, prop-rod, etc.

AT 18.000 KM (12,000 MILES)

As 6.000 km (4,000 miles) plus
Petrol models: Clean fuel sediment bowl.
Diesel models: Remove injectors, check and, if necessary, adjust.
Diesel models: Renew fuel filter element.
Diesel models: Clean sedimenter.
Lubricate dynamo.
Drain and refill gearbox and transfer box. } Replaces
Drain and refill differentials. } oil level
Drain and refill front swivel pin housings. } check.
Check all body bolts.
Check 'U' bolts and spring clips.
Check propeller shaft bolts.

AT 24.000 KM (16,000 MILES)

As 6.000 km (4,000 miles) and 12.000 km (8,000 miles).

AT 30.000 KM (20,000 MILES)

As 6.000 km (4,000 miles), plus
Clean crankcase emission control, flame-trap type, where fitted.

AT 36.000 KM (24,000 MILES)

As 6.000 km (4,000 miles), 12.000 km (8,000 miles) and 18.000 km (12,000 miles) plus:
Lubricate front propeller shaft sliding joint.

IMPORTANT NOTE:

All fluid in the brake system should be changed every eighteen months. It should also be changed before touring in mountainous areas if not done in the previous nine months.

Renew all rubber seals in brake system every three years if mileage covered is less than 64.000 km (40,000 miles).

ELECTRICAL

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. Remove headlamp bezel (E) retained by four screws (F).
2. Slacken the three recessed-head screws (A) turn and remove rim (D) lift out light unit (C) and remove from connector (B).
3. Bulb or light unit (C) as applicable can now be replaced.
4. Refit rim and headlamp bezel.

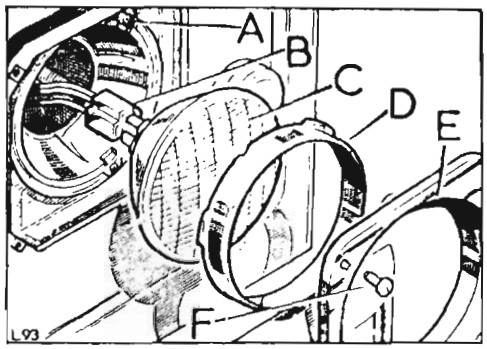


Fig. 60. Headlamp light unit replacement

Side, tail, stop and flasher lamps

To replace a bulb:

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

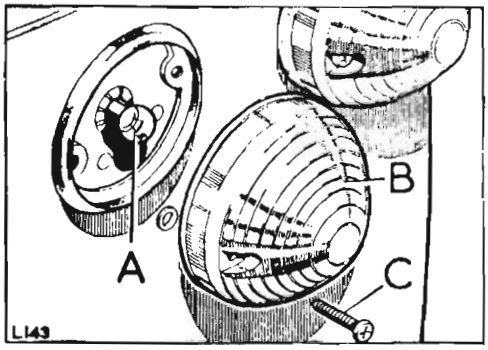


Fig. 61
Side, tail and stop lamp bulb replacement

Rear number plate illumination lamp (where applicable)

To replace the bulb:

1. Slacken the securing screw (C) and remove cover (B); the bulb (A) is then accessible in the lamp body.

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

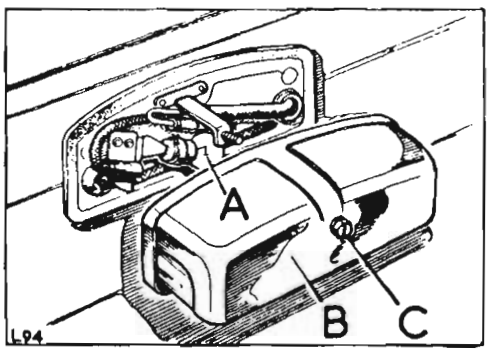


Fig. 62
Rear number plate illumination lamp

Interior light (where applicable)

To replace the bulb:

1. Remove screw (A) retaining cover (C) and rim (D).
2. Replace bulb (B) and refit cover and rim.

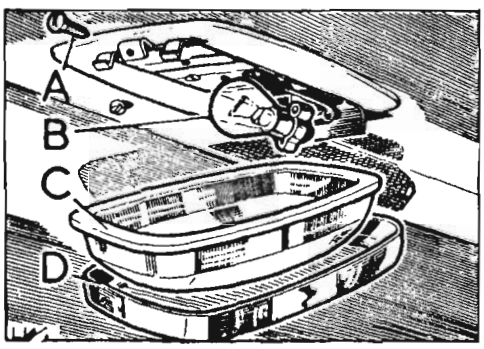


Fig. 63. Interior light

Warning lights

To replace warning lights:

1. Remove five screws (B) retaining instrument panel.
2. Bulbs (A) can then be replaced as necessary.

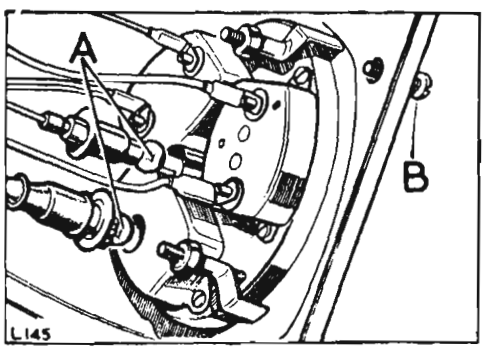


Fig. 64. Warning lights

Fuses

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

1. The cover (C) should be pulled off.

2. Replace fuse (A) as required:

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

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

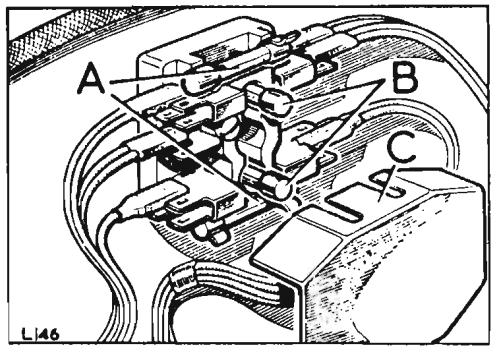


Fig. 65. Fuse box

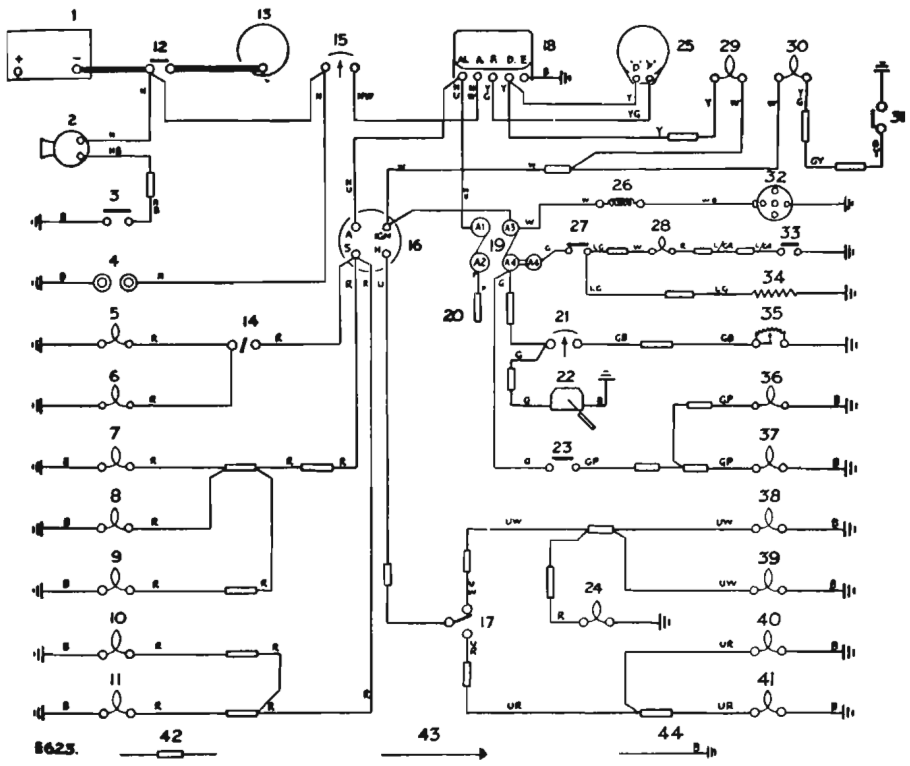
Circuit diagram, 2½ litre Petrol models, Series IIA, positive earth

1 Battery, 12 volt
2 Horn
3 Horn push button
4 Inspection light sockets
5 Panel illumination
6 Panel illumination
7 Tail light
8 Number plate illumination
9 Tail light
10 Side light
11 Side light
12 Starter switch
13 Starter
14 Panel light switch
15 Ammeter
16 Ignition and lighting switch
17 Headlight dip switch
18 Voltage control box
19 Fuse box
20 To interior lights
21 Fuel gauge
22 Screen wiper, plug and socket
23 Stop light switch
24 Main beam warning light
25 Dynamo
26 Ignition coil
27 Mixture switch
28 Mixture warning light
29 Charging warning light
30 Oil pressure warning light
31 Oil pressure switch
32 Distributor
33 Mixture thermostat switch
34 Carburetter heater element, optional equipment
35 Gauge, fuel tank
36 Stop light
37 Stop light
38 Headlight, main
39 Headlight, main
40 Headlight, dip
41 Headlight, dip
42 Snap connectors
43 Earth connections via terminals and fixing bolts
44 Earth connections via cables

Key to cable colours

B—Black G—Green N—Brown P—Purple R—Red U—Blue W—White Y—Yellow RN—Red with Brown, and so on

When cables have two-colour code letters, the first denotes the main and the latter the tracer.
On vehicles to the North American specification, the connections at the lighting switch are such that the sidelamps are extinguished when the headlamps are in use.



Circuit diagram, 2½ litre Petrol models, Series IIA, positive earth

Circuit diagram, 'Regular' and 'Long' Diesel models, Series IIA, with combined electrical services, starter and heater plug switch, positive earth

1 Batteries, two, 6 volt positive earth
2 Inspection socket
3 Horn push button
4 Heater plugs
5 Panel illumination
6 Panel illumination
7 Tail and number plate illumination lamp
8 Tail and number plate illumination lamp
9 Side lamp
10 Side lamp
11 Starter motor
12 Horn
13 Warning light, heater plug
14 Resistance for heater plug
15 Electrical services, starter and heater plug switch
16 Switch, panel light
17 Ammeter
18 Lighting switch
19 Current-voltage regulator
20 Fuse box
21 To interior lights
22 Switch, headlamp dip
23 Dynamo
24 Warning light, fuel level
25 Fuel gauge
26 Switch, stop light
27 Warning light, headlamp main beam
28 Warning light, charging
29 Gauge unit, fuel tank
30 Windscreen wiper motor
31 Warning light, oil pressure
32 Switch, oil pressure warning light
33 Stop lamp
34 Stop lamp
35 Headlamp, main beam
36 Headlamp, main beam
37 Headlamp, dip beam
38 Headlamp, dip beam
39 Snap connectors
40 Earth connections via terminals or fixing bolts
41 Earth connections via cables

Key to cable colours

B—Black G—Green S—Slate N—Brown P—Purple O—Orange R—Red U—Blue L—Light W—White Y—Yellow
RN—Red with Brown, and so on

When cables have two-colour code letters, the first denotes the main and the latter the tracer colour.

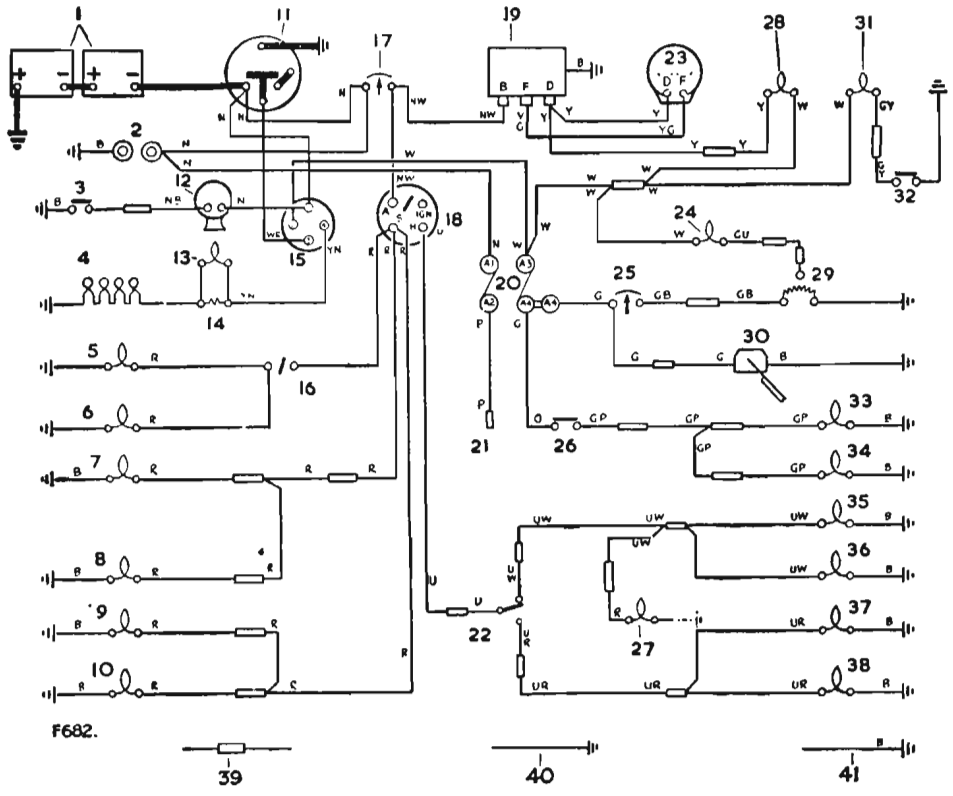


Fig. N1-4. Circuit diagram, 'Regular' and 'Long', Diesel models, Series IIA, with combined electrical services, starter and heater plug switch, positive earth

Key to circuit diagram, 4-cylinder '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 Voltage stabiliser, fuel gauge and temperature gauge
29 Switch, stop lamp
30 Switch, wiper
31 Indicator unit, flashers
32 Switch and warning light for flashers
33 Dynamo
34 Warning light, ignition
35 Warning light, oil pressure
36 Switch, cold start on control
37 Fuel gauge
38 Temperature gauge
39 Wiper motor
40 Switch, oil pressure
41 Distributor
42 Switch, cold start in cylinder head
43 Fuel tank unit
44 Temperature transmitter unit
45 Stop lamp, RH
46 Stop lamp, LH
47 Socket, wiper lead
48 Front flasher, RH
49 Rear flasher, RH
50 Rear flasher, LH
51 Front flasher, LH

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

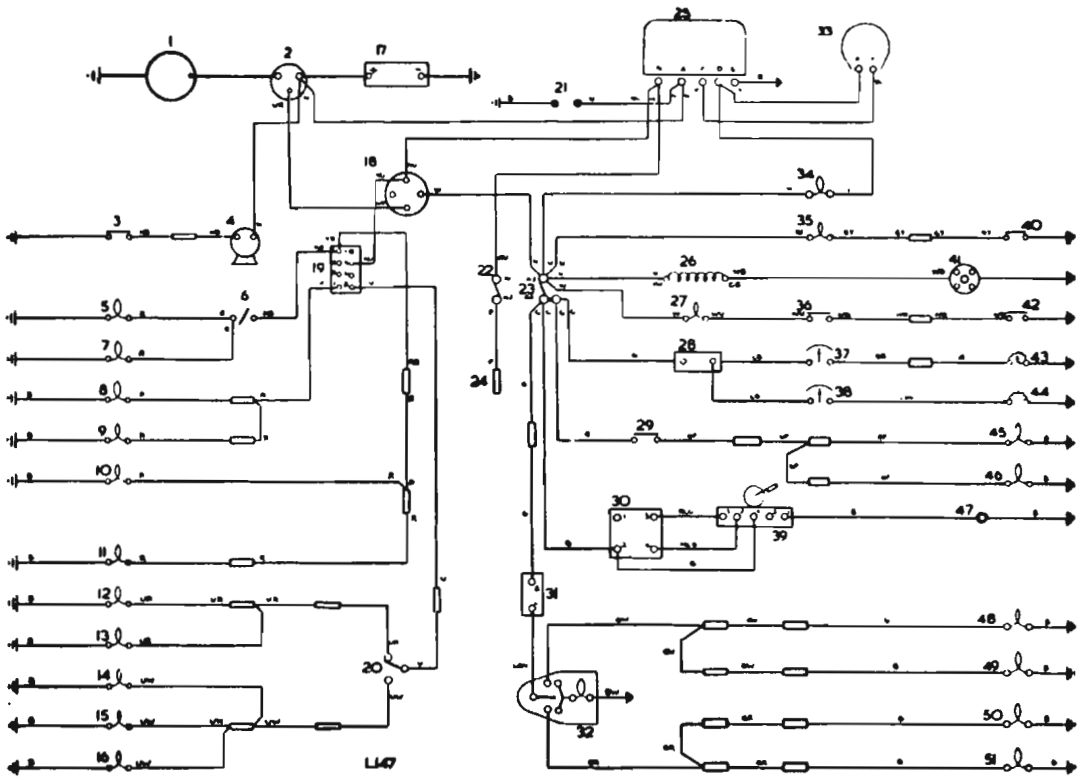


Fig. 66. Circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Petrol models, negative earth

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

1 Starter motor
2 Solenoid, starter motor
3 Horn
4 Horn push-button
5 Inspection lamp sockets
6 Panel illumination
7 Panel illumination
8 Switch, panel lights
9 Tail lamp, RH
10 Tail lamp, LH
11 Side lamp, RH
12 Side 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 Battery
19 Switch, ignition and starter
20 Switch, lights
21 Switch, headlamp dip
22 Dynamo
23 Fuse, A1–A2
24 Fuse, A3–A4
25 Feed, interior light, where fitted
26 Indicator unit, flashers
27 Switch and warning light for flashers
28 Regulator box
29 Warning light, ignition
30 Ignition coil
31 Warning light, oil pressure
32 Warning light, cold-start
33 Voltage stabiliser, 10 volt fuel gauge and temperature gauge
34 Switch, stop lamp
35 Switch, wiper
36 Switch, cold-start, on control
37 Fuel gauge
38 Water temperature indicator
39 Wiper motor
40 Dual fuel pump
41 Distributor
42 Switch, oil pressure
43 Switch, cold-start, in cylinder head
44 Fuel tank unit
45 Water temperature transmitter
46 Stop lamp, LH
47 Stop lamp, RH
48 Socket, wiper lead
49 Front flasher, RH
50 Rear flasher, RH
51 Rear flasher, LH
52 Front flasher, LH

Snap and Lucar connections —□—

Earth connections via terminals or fixing bolts ———|||||||

Earth connections via cables —B—|||||||

Cable colour code

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

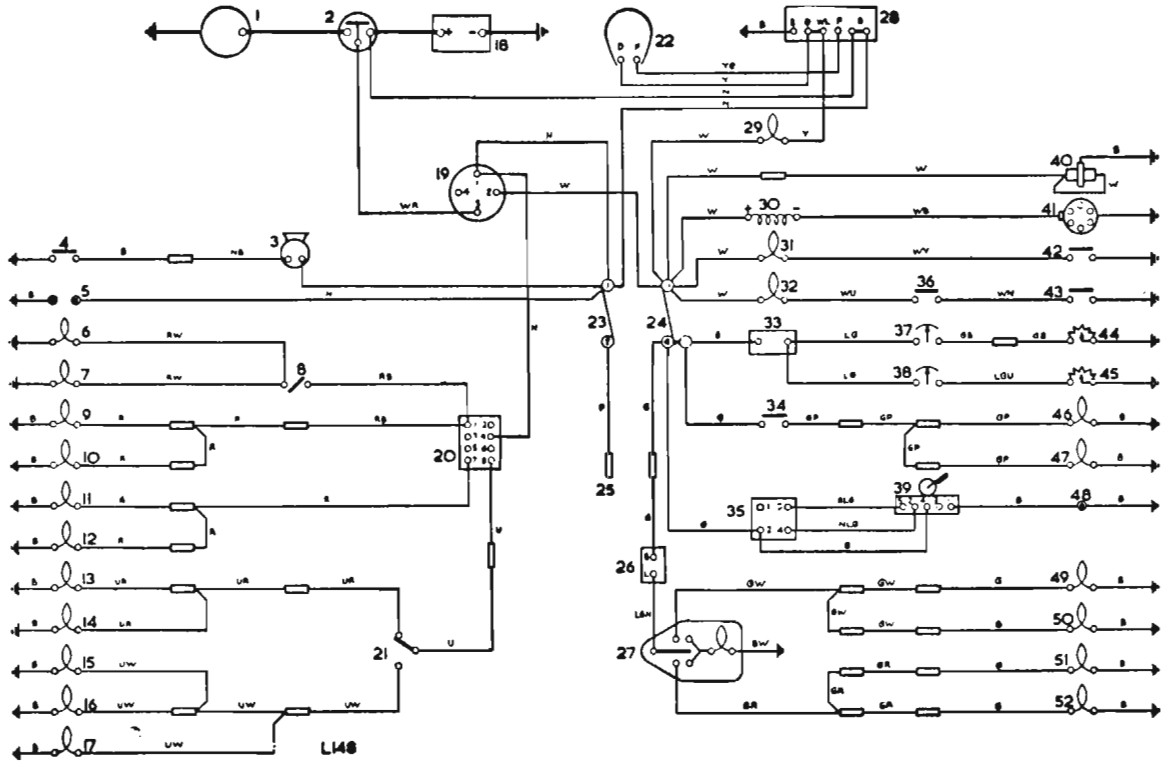


Fig. 67. Circuit diagram, 6-cylinder 'Long' and Station Wagon Petrol models, negative earth

Key to circuit diagram, 4-cylinder '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 Switch, stop lamp
29 Switch, wiper motor
30 Indicator unit, flasher
31 Switch and warning light for flashers
32 Dynamo
33 Warning light, dynamo
34 Warning light, oil pressure
35 Warning light, fuel level
36 Fuel gauge
37 Temperature gauge
38 Wiper motor
39 Switch, oil pressure
40 Fuel tank unit
41 Temperature transmitter unit
42 Stop lamp, RH
43 Stop lamp, LH
44 Socket, wiper lead
45 Front flasher, RH
46 Rear flasher, RH
47 Rear flasher, LH
48 Front flasher, LH

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

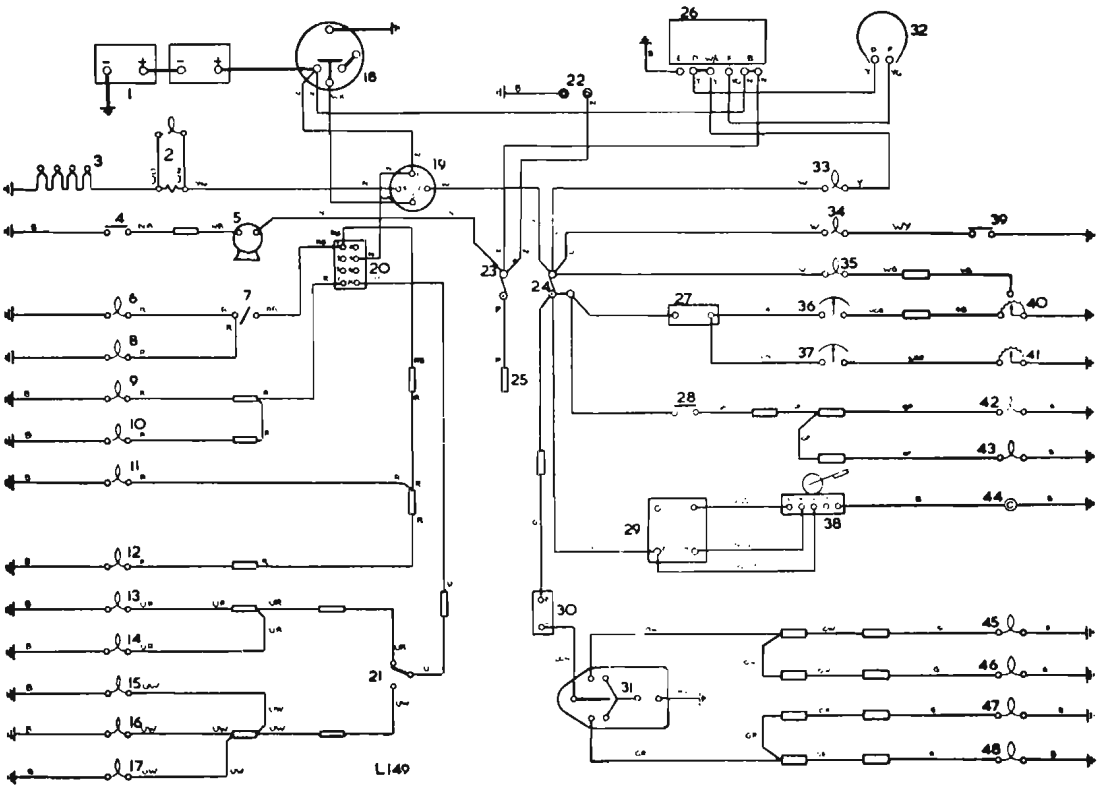


Fig. 68. Circuit diagram, 4-cylinder 'Regular', 'Long' and Station Wagon Diesel models, negative earth

Key to circuit diagram, 4-cylinder 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

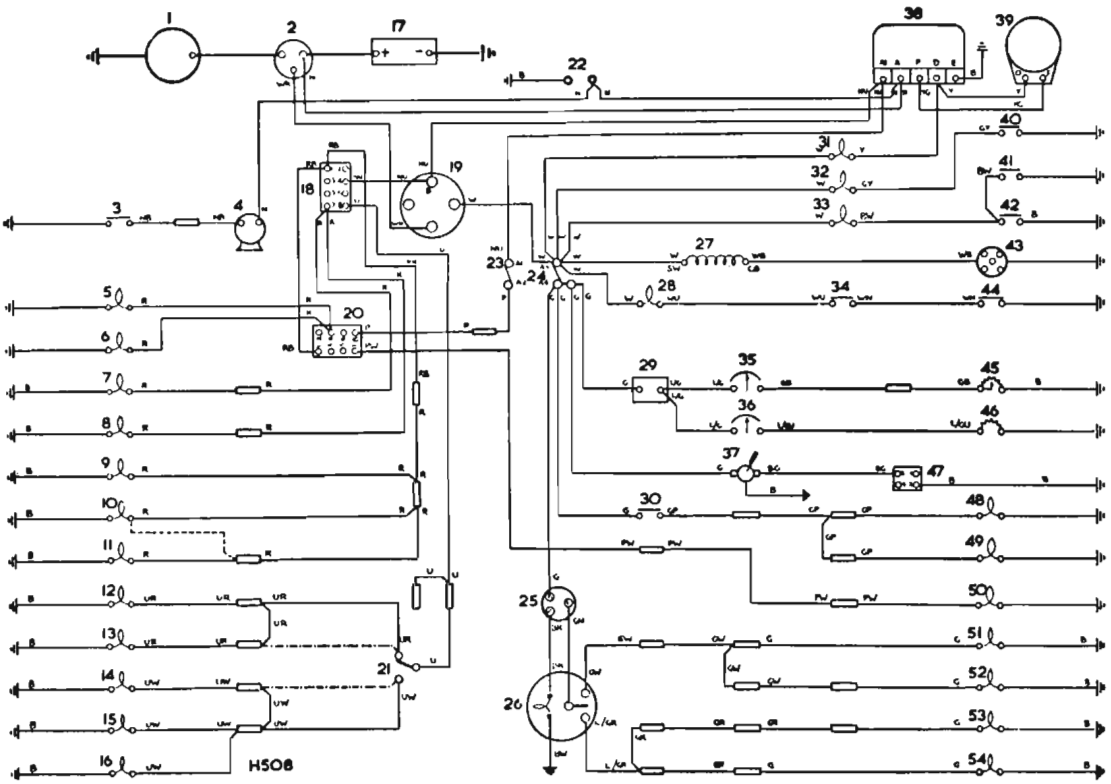
Dotted lined indicate circuit on LHD models

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, 4-cylinder Forward Control Petrol models, negative earth

Key to circuit diagram, 6-cylinder 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, brake servo
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

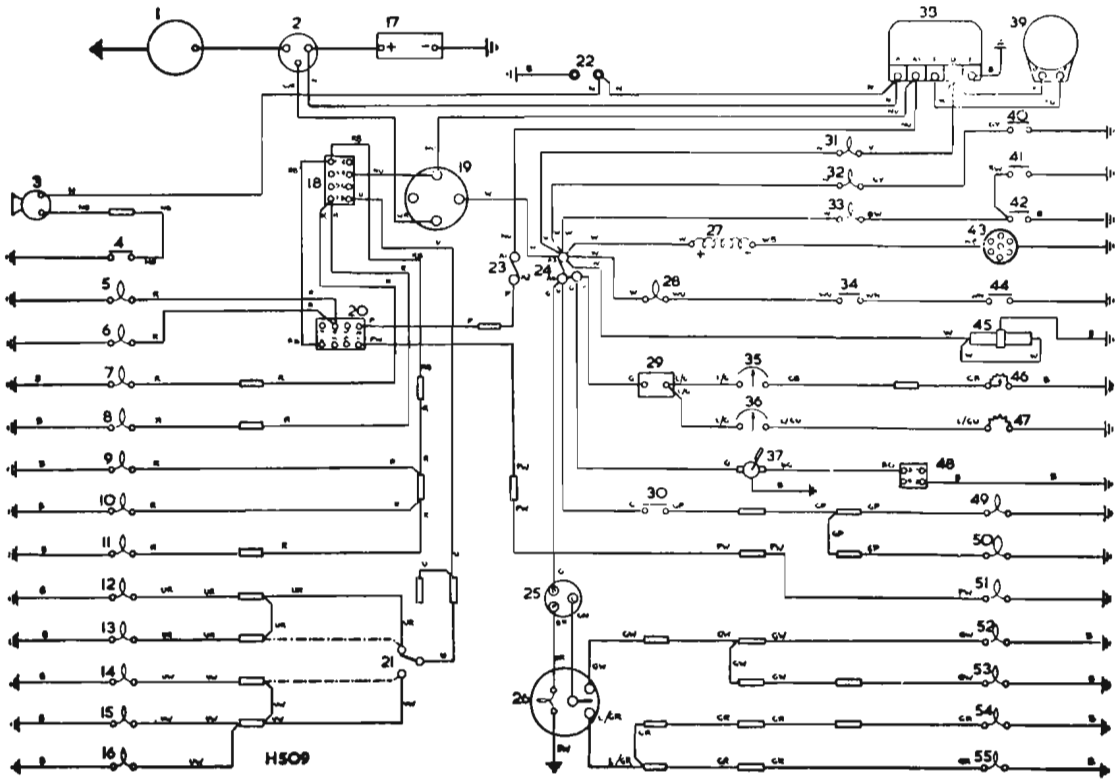
Dotted lines indicate circuit on LHD models

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, 6-cylinder Forward Control Petrol models, negative earth

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

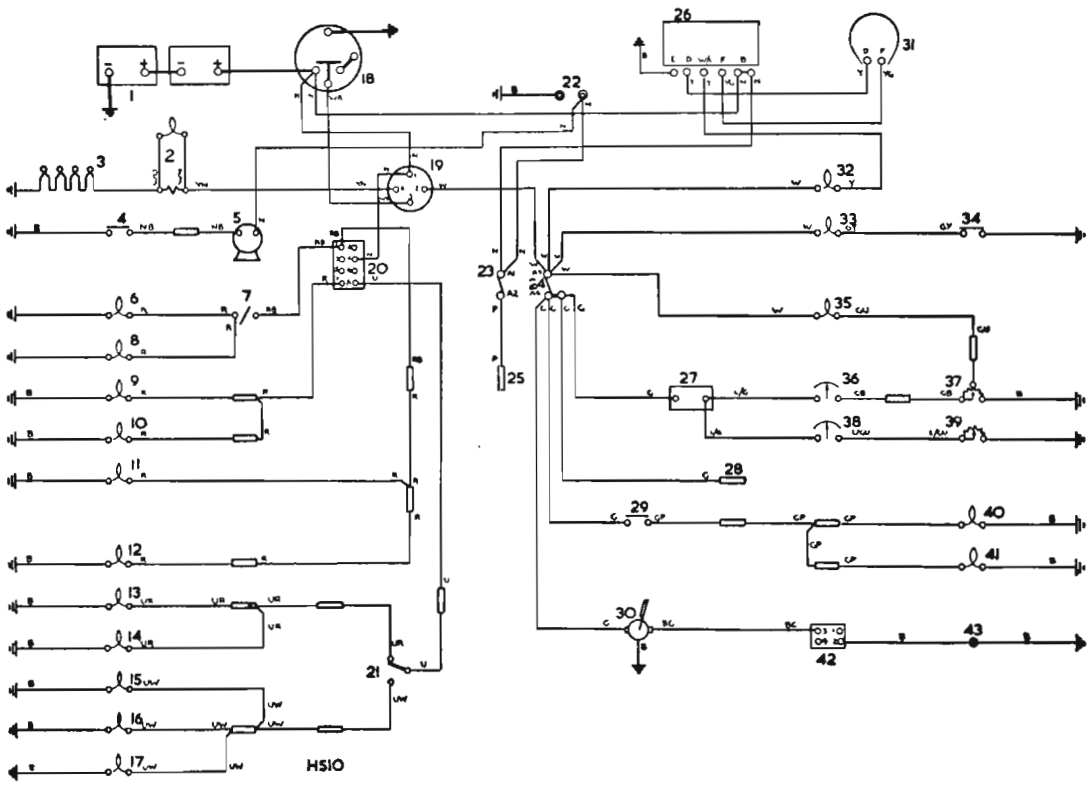
1 Batteries, two 6 volt
2 Warning light and resistor, heater plugs
3 Heater plugs
4 Horn push button
5 Horn
6 Panel light, speedometer
7 Switch, panel light
8 Panel light, instrument
9 Side lamp, RH
10 Side lamp, LH
11 Tail lamp, RH
12 Tail lamp, LH
13 Headlamp, RH, dipped beam
14 Headlamp, LH, dipped 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, 4-cylinder 'Regular', 'Long' and Station Wagon Diesel models, negative earth

Key to circuit diagram, 4-cylinder 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
35 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, brake servo
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

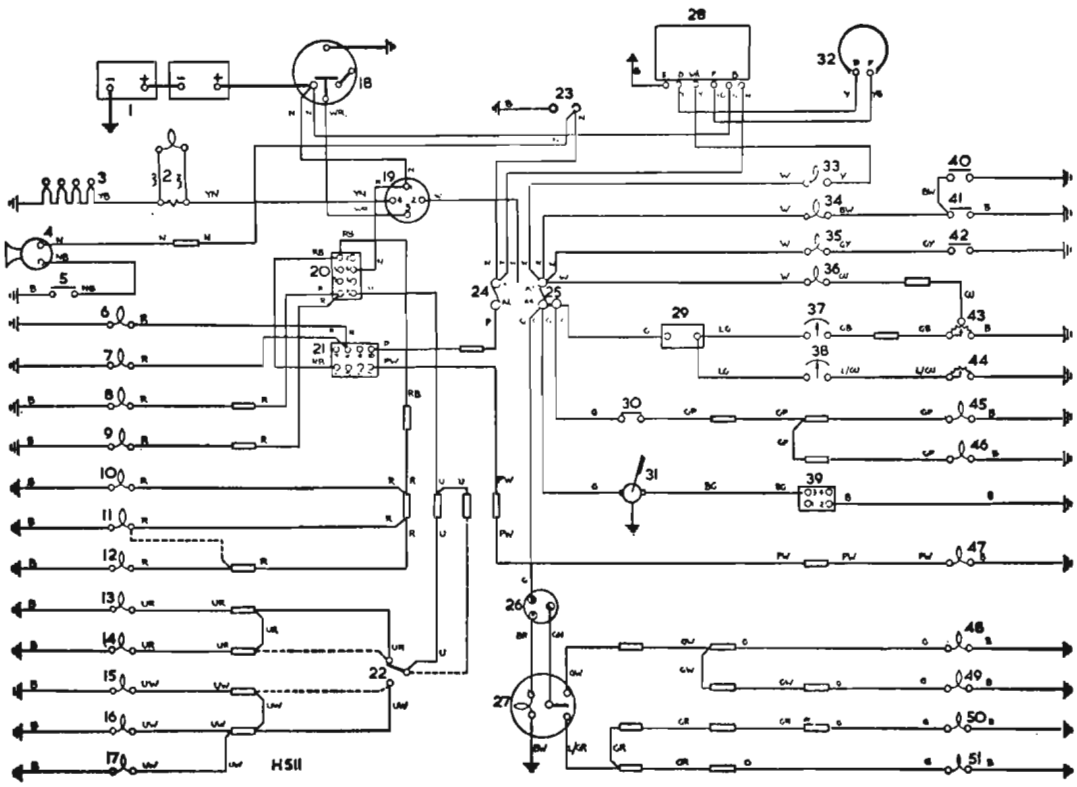
Dotted lines indicate circuit on LHD models

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, 4-cylinder Forward Control Diesel models, 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

} Flasher socket on vehicle

10 Interior lamp and switch

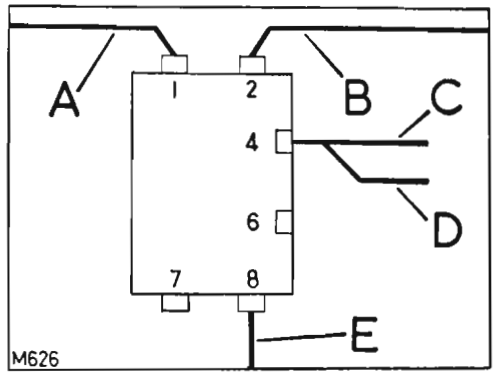
11 Flasher lamp, LH
12 Number plate illumination
13 Tail lamp, LH
14 Tail lamp, RH
15 Stop lamp, RH
16 Stop lamp, LH
17 Flasher lamp, RH
18 Plug for trailer

} Flasher plug on trailer

Dotted lines indicate wiring on vehicle

Snap and Lucar connections —□—

Earth connections —|||||—



Electrical connections at wiper/washer switch. Replaces items 30, 35 and 29 on Figs. 66, 67 and 68 respectively

A—Lead—Red and light green
B—Lead—Brown and light green
C—Lead—Green
D—Lead—Green
E—Lead from washer reservoir—Light green and black

Cable colour code

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

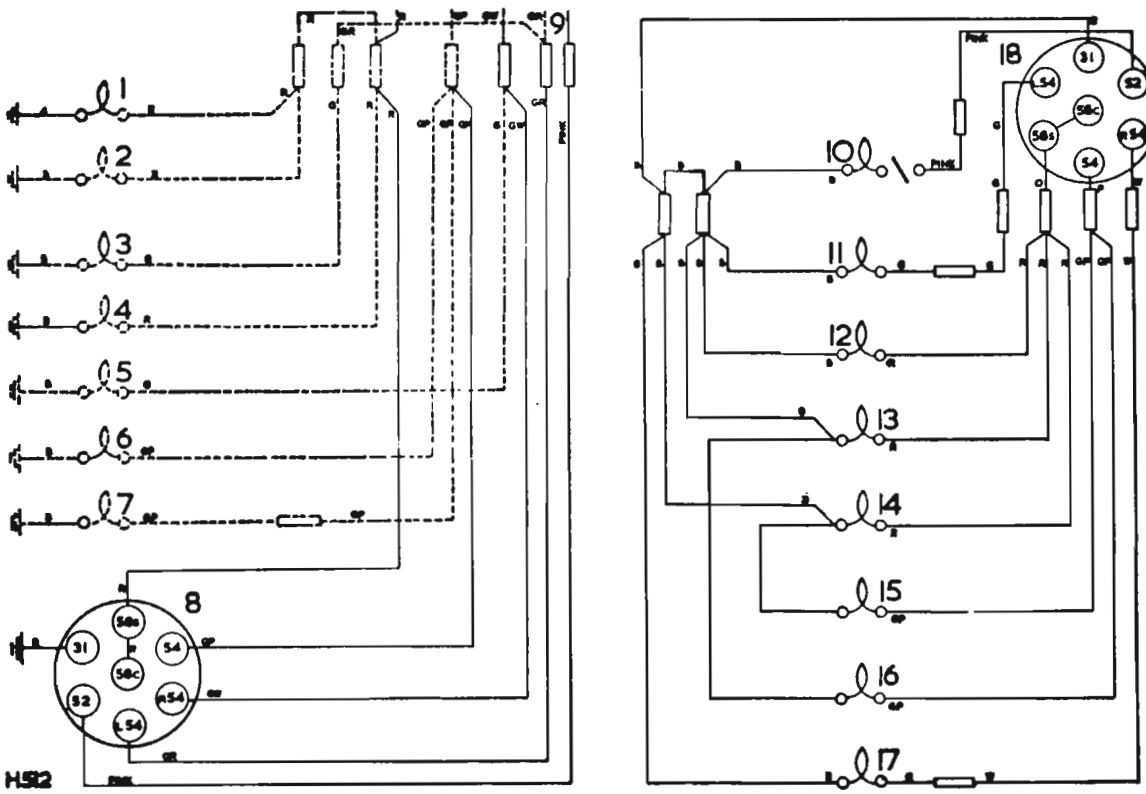


Fig. 69. Circuit diagram, flashers on trailer, negative earth

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.

Dust-proofed engine breather, Petrol models

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

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

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

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

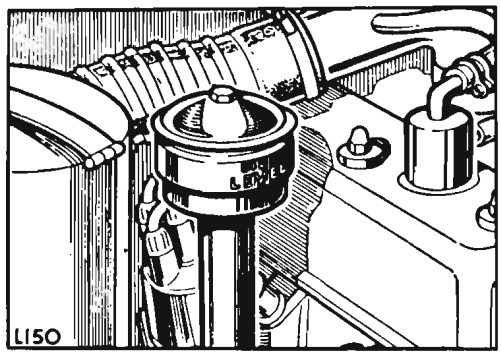


Fig. 70
Dust-proofed engine breather 'Regular" and 'Long' models illustrated

Raised air intake, Petrol models only

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

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

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

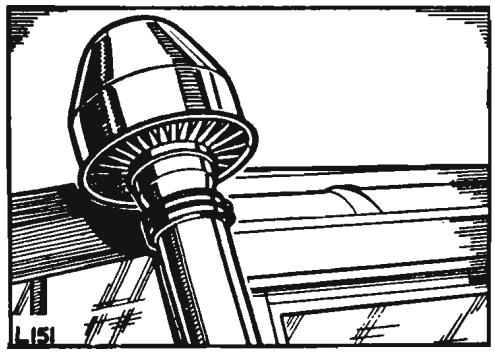


Fig. 71
Raised air intake,'Regular' and Long' models, illustrated

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 (15–18.6 kW) can be transmitted through the centre power take-off, or damage to the rear engine mountings will result.

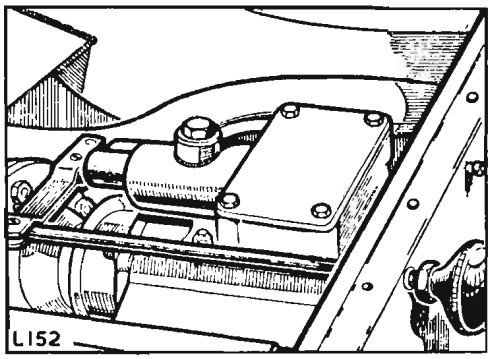


Fig. 72
Centre power take-off, 'Regular' and 'Long' models illustrated

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 12 to 25 mm (0.5 to 1 in.) 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

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.

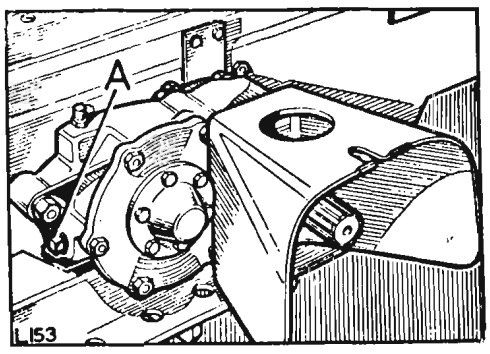


Fig. 73
Rear power take-off, 'Regular' and 'Long' models

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 (A) 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 filler-level plug hole with oil of the recommended grade. The oil capacity is approximately 0.5 litre (1 Imperial pint).

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 200 mm (8 in.) 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 (15.0 kW) is transmitted through the pulley.

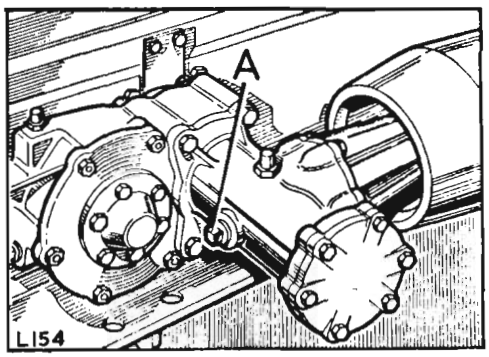


Fig. 74
Rear drive pulley, 'Regular' and 'Long' models

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 (A) 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 0,5 litre (0.75 Imperial pint).

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 (18.0 kW) at 2,000 RPM—Petrol models
20 BHP (15.0 kW) at 1,500 RPM
24 BHP (18.0 kW) at 2,000 RPM
20 BHP (15.0 kW) at 2,500 RPM } Diesel models
10 BHP (7.5 kW) at 3,000 RPM

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

Running time: 30 minutes.

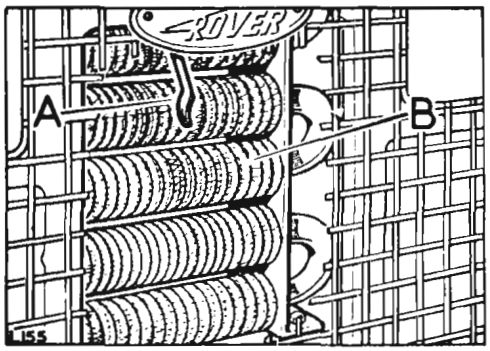


Fig. 75
Oil cooler, 'Regular' and 'Long' models illustrated

It incorporates a cooling radiator (B) 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 (194°F) and the engine must be switched off and the oil allowed to cool down if this temperature is reached under working conditions.

Engine governor, Petrol models only

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

Engine governor maintenance

Every 40 operation hours, check the oil in the governor body by removing the filler plug (A) 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 (B). Replace both plugs.

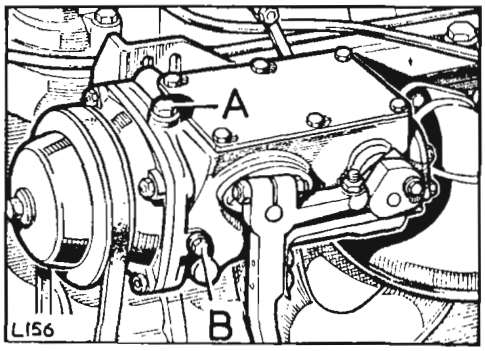


Fig. 76. Engine governor, Petrol models

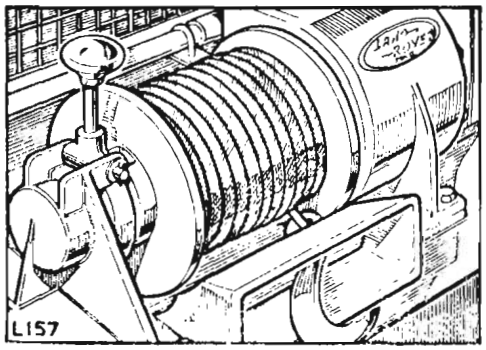


Fig. 77
Hydraulic winch 'Regular' and 'Long' installation

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 gear-box.

Operating controls are fitted to the heels 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 of the vehicle on Forward Control models.

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

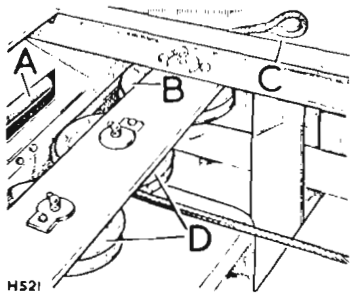
A spring-loaded roller is fitted to the drum; this retains the rope if the pull falls off.

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 in 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.



Cable guide wheels, Forward Control models

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

Instructions for using hydraulic winch

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. Transfer box lever should be placed in the neutral position.

3. Engage 3rd gear in the main gearbox and pull out the power 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.

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 lb (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 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.

Hydraulic winch maintenance

1. Every 40 operation hours check the oil level in the hydraulic oil supply tanks by removing cover plate (A) Fig. 78 and filler cap (B) Fig. 78. 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 (A) Fig. 79 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 (D) Fig. 78. At the same time remove and clean the tank oil filter (C) Fig. 78.

   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: 20,0 litres (4.5 gallons), 7.5 US gallons.
   Winch gearbox: 1,0 litre (2 pints), 2.5 US pints.

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.

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

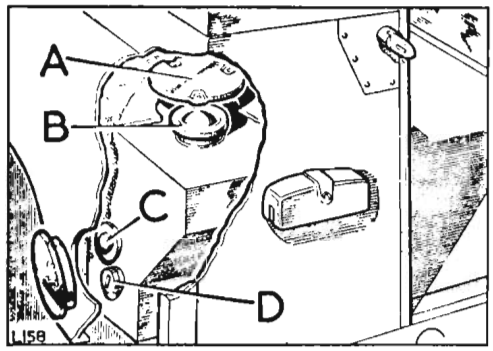


Fig. 78
Supply tank for hydraulic winch, 'Regular' and 'Long' models illustrated

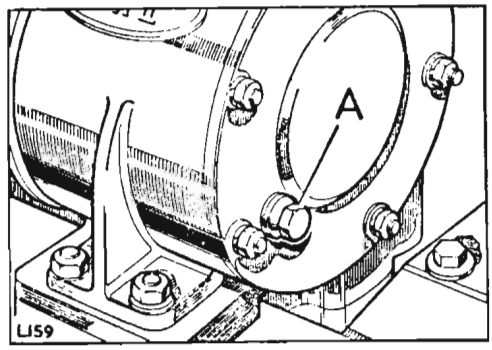
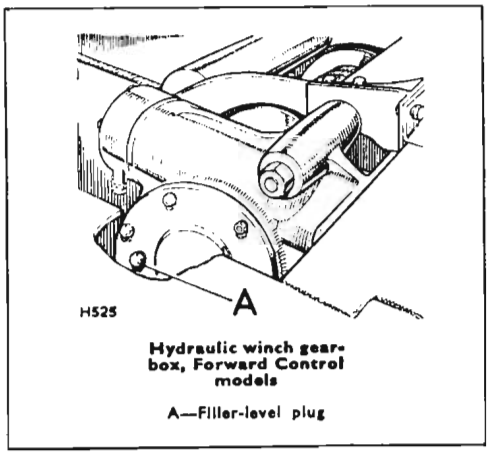


Fig. 79
Hydraulic winch gearbox, 'Regular' and 'Long' models



Hydraulic winch gearbox, 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 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 are very dim when the starter is operated, the battery requires charging from an independent electrical supply.

   It could 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 0,75 to 0,80 mm (0.029 to 0.032 in.). 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 7 mm (0.25 in.) 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 0,35 to 0.40 mm (0.014 to 0.016 in.).

      (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 clean.

   (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 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 page 74.

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

   (i) By raising the cover from the plug terminal about 7 mm (0.25 in.) 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 0,35 to 0,40 mm (0.014 to 0.016 in.) 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 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 a 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 0,75 to 0,89 mm (0.029 to 0.032 in.) 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.

Start 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 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 or 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 vaccum.
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 stops 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 CAV Agent.
6. Tappets incorrectly set. Reset inlet and exhaust tappets to 0,25 mm (0.010 in.) 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 intermittent output. Check the ammeter reading when the vehicle is running steadliy 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 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 the 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. Light 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.

Engine, 4-cylinder Petrol models

Bore		90,49 mm (3.562 in.)	
Stroke		88,9 mm (3.500 in.)	
Number of cylinders		4	
Cylinder capacity		2,286 cc (139.5 cu. in.)	
Compression ratio		8.0:1	
		7.0:1 Optional	
BHP	BHP and maximum torque figures are derived from bench tests and do not allow for installation losses in the vehicle	81 (160.5 kW) at 4,250 rpm	
Maximum torque		17.5 mkg (127 lb/ft) at 2,500 rpm	
Firing order		1, 3, 4, 2	
Sparking plug type			
8.0:1 compression ratio		Champion UN12Y	
7.0:1 compression ratio		Champion N8	
Sparking plug point gap		0,75 to 0,80 mm (0.029 to 0.032 in.)	
Distributor contact breaker gap		0,35 to 0,40 mm (0.014 to 0.016 in.)	
Ignition timing (static—full retard)			
8.0:1 compression ratio		TDC when using 90 octane fuel	
7.0:1 compression ratio		3° BTDC 83 octane fuel	United Kingdom
Ignition timing to be set to			Use two-star
8.0:1 compression ratio		3° ATDC 85 octane fuel	grade fuel
7.0:1 compression ratio		TDC when using 75 octane fuel	
Tappet clearance, inlet		0,25 mm (0.010 in.)	Engine at
Tappet clearance, exhaust		0,25 mm (0.010 in.)	running temperature
Valve timing (No. 1 exhaust valve peak		95° BTDC	
Oil pressure		3,2 to 4,6 kg/cm² (45 to 65 lb/sq in) at 50 kph (30 mph) 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		77,8 mm (3.063 in.)	
Stroke		92,075 mm (3.625 in.)	
Number of cylinders		6	
Cylinder capacity		7.8:1	
		7.0:1 Optional and Forward Control models	
BHP	BHP and maximum torque figures are derived from bench tests and so not allow for installation losses in the vehicle.	95 (71.0 kW) at 4,500 rpm	
		88 (65.8 kW) at 4,500 rpm Forward Control models	
Maximum torque		18,5 mkg (134 lb/ft) at 1,750 rpm	
		17,9 mkg (130 lb/ft) at 1,500rpm Forward Control models	
Firing order		1, 5, 3, 6, 2, 4	
Sparking plugs			
7.8:1 and 7.0:1 compression ratio		Champion N5	
Sparking plug point gap		0,75 to 0,80 mm (0.029 to 0.032 in.)	
Distributor contact breaker gap		0,35 to 0,40 mm (0.014 to 0.016 in.)	
Ignition timing (static—full retard)			
7.8:1 compression ratio		2° ATDC 90 octane fuel	United Kingdom
		6° ATDC, 85 octane fuel	use 2 star
7.0:1 compression ratio		TDC, 83 octane fuel	grade fuel
Ignition timing to be set to			
7.0:1 compression ratio		2° BTDC when using 90 octane fuel	

General data

Tappet clearance, inlet	0,15 mm (0.006 in.). Engine hot
Tappet clearance, exhaust	0,25 mm (0.010 in.). Engine hot or cold
Valve timing (No.1 exhaust valve peak)	
7.8:1 compression ratio	106° BTDC
7.0:1 compression ratio	106° BTDC
Oil pressure	2,8 to 3,5 kg/cm² (40 to 50 lb/sq in.) at 50 kph (30 mph) 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 230 mm (9 in.) diameter. Hydraulic operation
Adjustment	Hydrostatic clutch. No adjustment necessary

Clutch, 6-cylinder models

Type	241 mm (9.2 in.) 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 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

General data

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	29.7:1
Reverse	16.3:1	33.2:1

Gear ratios, long 1 ton and 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 chassis side-member
Carburetter, all Forward Control models	SU HD 6 single horizontal, dust-proof
Carburetter	Zenith Type 175 CD 2S single horizontal, dust-proof
Air cleaner, all models	Oil bath type with integral centrifugal pre-cleaner

Fuel system, Diesel models

Fuel pump	Mechanical with hand primer (high pressure type)
Air cleaner	Oil bath type with integral centrifugal pre-cleaner
Fuel filters	Paper type element and sedimenter

Injection system, Diesel models

Injector pump	Distributor type, self-governing
Injectors: Type	CAV Pintaux, nozzle size BDNO/SPC 6209
Start of injection	16° BTDC

Cooling system

Type	Pump, fan and thermostat; pressurised to 0,6 kg/cm^2 (9 lb/sq in.)

Electrical system, Petrol models

Type	See note inside front cover
Voltage	12
Battery capacity	58 AH
Ignition system	Coil
Charging circuit	4 cylinder models. Compensated voltage control 6 cylinder models. Current voltage control

Electrical system. Diesel models

Type	See note inside front cover
Voltage	12. Two 6 volt batteries in series
Battery capacity	120 AH
Charging circuit	Current-voltage control

Replacement bulbs and units

Headlamps with bulbs:

LHStg Italy	Lucas 410, 12 v, 45/40 w, Duplo clear
LHStg France	Lucas 411, 12 v, 45/40 w, Duplo yellow

Headlamps with sealed beam units:

RHStg	Lucas 54521872 60/45 w
LHStg Europe except France and Italy	Lucas 54523079 60/50 w
LHStg Except Europe	Lucas 54522231 50/40 w
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, 6 w
Instrument panel lights	Lucas 987, 12 v, 2.2 w MES
Warning lights	Lucas 987, 12 v, 2.2 w MES
Warning light, brakes	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	Rover Part No. 560756 Mini-lamp 12/14 v .04 A
Warning light, flashers	Magnatex GBP 12 v 2.2 w
Interior light	Lucas 382, 12 v, 21 w

Suspension

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

General data

Brakes

Foot brake 88	Hydraulic, 254 mm (10 in.) brake drums
Foot brake 109	Hydraulic, 279 mm (11 in.) brake drums. Servo assisted on 6-cylinder 'Long', 1 ton and Forward Control models
Hand brake	Mechanical on transfer box output shaft

Steering

Type	Recirculating ball	
	'Regular', 'Long' and Station Wagon models	1 ton and Forward Control models
Ratio: Straight ahead	15.6:1	19.6:1
Full lock	23.8:1	29.9:1
Front wheel toe-in	1,2 to 2,3 mm (0,046 to 0.093 in.)	
Camber angle	1.5°	
Castor angle	3°	
Swivel pin inclination	7°	

Capacities

Component	Litres	Imperial unit	US unit
Engine sump oil, 4-cylinder	6,0	11 pints	13 pints
Engine sump oil, 6-cylinder	6,8	12 pints	14 pints
Extra when refilling after fitting new filter, 4-cylinder	0,85	1.5 pints	1.8 pints
Extra when refilling after fitting new filter, 6-cylinder	0,5	1 pint	1.2 pints
Air cleaner oil, 4-cylinder	0,85	1.5 pints	1.8 pints
Air cleaner oil, 6-cylinder	0,5	1 pint	1.2 pints
Main gearbox oil	1,5	2.5 pints	3 pints
Transfer box oil	2,5	4,5 pints	5.5 pints
Rear differential (Standard)	1,75	3 pints	3.5 pints
Front differential (Standard)	1,75	3 pints	3.5 pints
Rear differential (ENV type)	1,4	2.5 pints	3.5 pints
Front differential (ENV type)	1,4	2.5 pints	3.5 pints
Swivel pin housing oil (each)	0,5	1 pint	1.2 pints
Fuel tank, 4-cylinder models	45	10 gallons	12 gallons
Fuel tank, 6-cylinder Station Wagon and Forward Control models	73	16 gallons	19 gallons
Cooling system, 4-cylinder Petrol models except Forward Control	8,1	14.25 pints	17.1 pints
Cooling system, 4-cylinder Petrol Forward Control models	10,8	19 pints	22¾ pints
Cooling system, 6-cylinder Petrol Forward Control models	13,0	23 pints	27¾ pints
Cooling system, 6-cylinder Petrol 'Long' models	11,2	20 pints	24 pints
Cooling system, Diesel models except Forward Control	7,8	13.75 pints	16.5 pints
Cooling system, Diesel models Forward Control	10,5	18 pints	21½ pints
Hydraulic front winch, supply tank	20,0	4.5 gallons	7.5 gallons
Hydraulic front winch, gearbox	1,0	2 pints	2.4 pints

General data

Dimensions and Weights	'Regular'		'Regular' Station Wagon		'Long'		'Long' Station Wagon		1 Ton		110 Forward Control	
	Metric	British	Metric	British	Metric	British	Metric	British	Metric	British	Metric	British
Overall length	3.62 m	142.562 in.	3.62 m	142.375 in.	4,44 m	175 in.	4,44 m	175 in.	4,44 mm	175 in.	4,90 m	193 in.
Overall width	1,68 m	66 in.	1,68 m	66 in.	1,68 m	66 in.	1,68 m	66 in.	1,68 mm	66 in.	1,92 m†	75½ in.†
Overall unladen height, hood up	1,97 m	77.5 in.	—	—	—	—	—	—	—	—	—	—
Overall unladen height, hood down, screen up	1,73 m	68 in.	—	—	—	—	—	—	—	—	—	—
Overall unladen height, hood down, screen down	1,46 m	57.5 in.	—	—	—	—	—	—	—	—		—
Overall unladen height, with cab or hard top	1,95 m	76.875 in.	1,98 m	77.875 in.	2,06 m	81 in.	2,07 m	81.375 in.	2,10 m	83 in.	2,24 m	88½ in.
Wheelbase	2,23 m	88 in.	2,23 m	88 in.	2,77 m	109 in.	2,77 m	109 in.	2,77 m	109 in.	2,77 m	109½ in.
Track	1,31 m	51.5 in.	1,31 m	51.5 in.	1,31 m	51.5 in.	1,31 m	51.5 in.	1,31 m	51.5 in.	1 36 m	57½ in.
Turning circle	11,6 m	38 ft.	11,6 m	38 ft.	14,3 m	47 ft.	14,3 m	47 ft.	14,3 m	47 ft.	15,8 m	48 ft.
Unladen ground clearance under differentials, 6.00 x 16 tyres	203 mm	8 in.	203 mm	8 in.	—	—	—	—	—	—	—	—
Unladen ground clearance under differentials, 7.00 x 16 tyres	222 mm	8.75 in.	222 mm	8.75 in.	—	—	—	—	—	—	—	—
Unladen ground clearance under differentials, 7.50 x 16 tyres	—	—	—	—	248 mm	9.75 in.	248 mm	9.75 in.	—	—	—	—
Unladen ground clearance under differentials, 9.00 x 16 tyres	—	—	—	—	—	—	—	—	298 mm	11.75 in.	254 mm	10 in.
Weight running, with water, oil, 5 gallons fuel: Petrol models	1.339 kg	2,953 lb.	1.488 kg	3,281 lb.	1.497 kg	3.301 lb.	1.702 kg	3,752 lb.	2.060 kg* 1.691 kg**	3,886 lb. 3,728 lb.	1.970 kg	4,340 lb.
Diesel models	1.405 kg	3.097 lb.	1.557 kg	3,435 lb.	1.574 kg	3,471 lb.	1.778 kg	3,922 lb.	—	—	2.043 kg	4,505 lb.

† With two exterior mirrors

* 6-cylinder Petrol models

** 4-cylinder Petrol models

Dimensions and Weights	'Regular'		'Regular' Station Wagon		'Long'		'Long' Station Wagon		1 Ton		110 Forward Control	
	Metric	British	Metric	British	Metric	British	Metric	British	Metric	British	Metric	British
Maximum approved payload, normal roads	*Driver, two passengers and: 454 kg 1,000 lb.		*7 persons and: 45 kg 100 lb.		Driver, two passengers and: 908 kg 2,000 lb.		10 persons and: 181 kg 400 lb.		Driver, two passengers and: 1.015 kg 2,240 lb.		2 persons and: 1.525 kg	3,360 lb
Maximum approved payload, cross-country	Driver, two passengers and: 363 kg 800 lb.		6 persons and: 23 kg 50 lb.		Driver, two passengers and: 816 kg 1,800 lb.		10 persons and: 91 kg 200 lb.		Driver, two passengers and: 1.015 kg 2,240 lb. 1.270 kg 2,800 lb.		2 persons and: 1.270 kg	2,800 lb
Maximum drawbar pull, dependent upon surface conditions: Petrol models	1.800 kg	4,000 lb.	1.800 kg	4,000 lb.	1.600 kg	3,500 lb.	1.600 kg	3,500 lb.	1.600 kg	3,500 lb.	1.800 kg**	4,000 lb
Diesel models	1.497 kg	3,300 lb.	1.497 kg	3,300 lb.	1.315 kg	2,900 lb.	1.315 kg	2,900 lb.	—	—	1.800 kg	4,000 lb.
Maximum roof rack load	50 kg	112 lb.	50 kg	112 lb.	50 kg	112 lb.	50 kg	112 lb.	50 kg	112 lb.	—	—
Internal body dimensions: Length (between cappings)	1,09 m	43 in.	—	—	1,85 m	72.75 in.	—	—	1,85 m	72.75 in	3,14 m††	123½ ir
Width (between cappings)	1,44 m	56.875 in.	—	—	1,44 m	56.875 in.	—	—	1.44 m	56.875 in	1,61 m††	63½ ir
Depth	495 mm	19.5 in.	—	—	483 mm	19 in.	—	—	483 mm	19 in.	—	—
Height of wheel arch	216 mm	8.5 in.	—	—	229 mm	9 in.	—	—	229 mm	9 in.	—	—
Width of wheel arch (to body side)	349 mm	13.75 in.	—	—	349 mm	13.75 in.	—	—	349 mm	13.75 in.	—	—
Width of floor (between wheel arches)	921 mm	36.25 in.	—	—	921 mm	36.25 in.	—	—	921 mm	36.25 in.	—	—
Height, floor to roof (maximum)	1,23 m	48.5 in.	—	—	1.22 m	48 in.	—	—	1,22 m	48 in.	—	—

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

Tyre pressures

Model		Normal				Emergency soft			
		Load under 250 kg (550 lb.)		Load over 250 kg (550 lb.)		Load under 250 kg (550 lb.)		Load over 250 kg (550 lb.)	
88 Bonneted Control models		Front	Rear	Front	Rear	Front	Rear	Front	Rear
6.00, 6.50 and 7.00 x 16.00	kg cm²	1.8	1.8	1.8	2,1	1,1	1,1	1,1	1,4
	lb sq in.	25	25	25	30	15	15	15	20
	bars	1.72	1.72	1.72	2.07	1.03	1.03	1.03	1.38
7.50 x 16.00	kg cm²	1.8	1.8	1.8	2,1	0,8	0,8	0,8	1,4
	lb sq in.	25	25	25	30	12	12	12	20
	bars	1.72	1.72	1.72	2.07	0.83	0.83	0.83	1.38
109 Bonneted Control and 1 Ton models									
7.50 x 16.00	kg cm²	1,8	1,8	1,8	2,5	1,1	1,1	1,1	1,8
	lb sq in.	25	25	25	36	15	15	15	26
	bars	1.72	1.72	1.72	2.48	1.03	1.03	1.03	1.79
Michelin 7.50 x 16.00 XY	kg cm²	1,8	1,8	1,8	3,0	1,1	1,1	1,1	2,5
	lb/sq in.	25	25	25	42	15	15	15	35
	bars	1.72	1.72	1.72	2.89	1.03	1.03	1.03	2.4
9.00 x 16 00	kg cm²	1,4	1,4	1,4	2,1	0,7	0,7	0,7	1,4
	lb/sq in.	20	20	20	30	10	10	10	20
	bars	1.38	1.38	1.38	2.07	0.7	0.7	0.7	1,38
110 Forward Control models 9.00 x 16.00	kg/cm²	2,0	1,3	2,5	2,1	0,8	0,8	0,8	1,1
	lb/sq in.	28	18	35	30	12	12	12	15

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 0,1 kg/cm² (2 lb/sq in.), 0.17 bars higher at running temperature.
2. Always replace the valve caps, as they form a positive seal on the valves.
3. Any unusual pressure loss in excess of 0,05 to 0,20 kg/cm² (1 to 3 lb/sq in.), 0.07 to 0.21 bars per month should be investigated and corrected.
4. Always check the spare wheel, so that it is ready for use at any time.

CONVERSION CHART

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