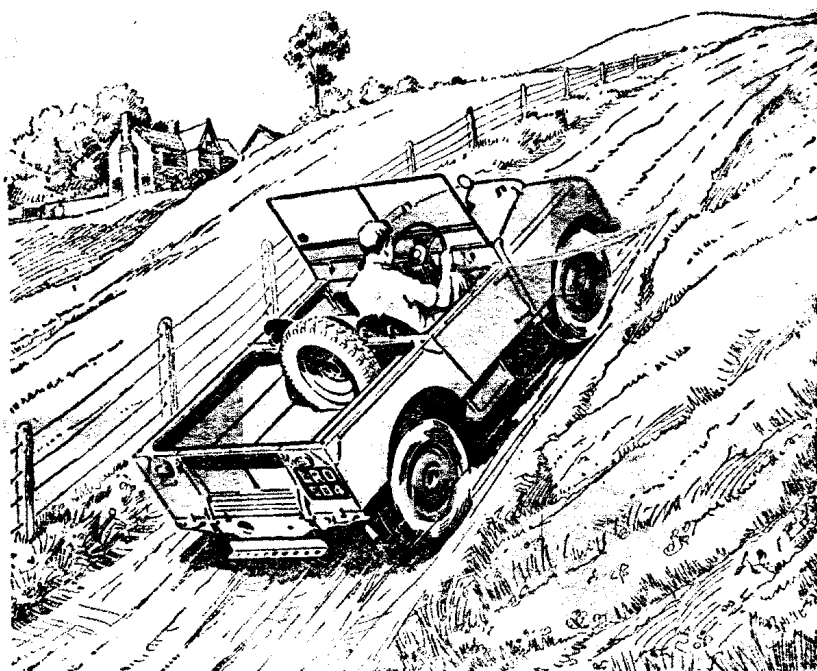


LAND ROVER



OPERATION MANUAL

IMPORTANT

NOMENCLATURE

As this manual covers both Right and Left-hand Drive models, reference is made throughout the text to the “left-hand” and “right-hand” sides of the vehicle, rather than to the “near-side” and “off-side.” The “left-hand side” is that to the left hand when viewed from the rear; similarly “left-hand drive” models are those having the driving controls on the left-hand side, again when the vehicle is viewed from the rear.

CAPACITIES

All capacities are quotes in Imperial and Metric measure; to ascertain the U.S. equivalent, multiply the Imperial figure by 1.2.

GUARANTEE

In order to obtain the Certificate of Guarantee operative with your vehicle, it is essential that you should, with the minimum of delay, either fill in and post the guarantee form supplied or ask your supplier to do it for you. Failure to do so may seriously jeopardise any claim you have on the Company under the terms of the standard guarantee.

GEAR RATIOS

The Land-Rover is equipped with a transfer box giving a secondary series of low gear ratios for heavy work. You are advised to consult “Gear Changing Instructions” for full details of the operation of this transfer box.

LOCKING

To protect your Land-Rover against theft, always remove the ignition key when parking. As an additional precaution the distributor rotor arm may also be removed or the petrol tap on the sediment bowl turned “OFF.”

MAINTENANCE

In order to obtain maximum service and dependability from your Land-Rover, maintenance items listed in this manual should receive regular attention. They are few in number and quite straightforward and will amply repay the small amount of time which needs to be devoted to them.

OPERATION MANUAL

-- for the --

LAND ROVER

Regd. Trade Mark

1948-51 MODELS

Vehicles numbered:

R860001 to R863000	) Standard vehicle
R8663001 onwards	) Right-hand drive.
R06100001 onwards	)
L860001 to L863000	) Standard vehicle
L8663001 onwards	) Left-hand drive.
L06100001 onwards	)
R8670001 onwards	) Station wagon
R06200001 onwards	) Right-hand drive.
L8670001 onwards	) Station wagon
L06200001 onwards	) Left-hand drive.
R8680001 onwards	) Welding outfit vehicle
R06300001 onwards	) Right-hand drive.
L8680001 onwards	) Welding outfit vehicle
L06300001 onwards	) Left-hand drive.

(The prefix R is omitted from vehicles built to Home requirements, bearing serial numbers 061 10348, 06200265 and 06300001 onwards).

THE ROVER CO. LTD.,
SOLIHULL, BIRMINGHAM, ENGLAND.

Telephone: *SHEldon* 2461.
Telegrams: *Rover, Solihull.*

SERVICE DEPT.
SOLIHULL, BIRMINGHAM, ENGLAND.

Telephone: *SHEldon* 2461.
Telegrams: *Rovrepair, Solihull.*

London Service Station
SEAGRAVE ROAD,
FULHAM, LONDON S.W.6., ENGLAND.

Telephone: *FULham* 1221.
Telegrams: *Rovrepair, Wesphone, London.*

*A copy of this
operation manual is
sent out with each
vehicle. Additional
copies are obtainable
from either of the
addresses opposite.
PRICE – 5/-*

ROVER PHONES:

Solihull (<i>Head Office</i>)	-	<i>SHEldon</i>	2461
Solihull Service Dept.	-	<i>SHEldon</i>	2461
London Service Station	-	<i>FULham</i>	1221

APRIL, 1950.

Publication. No. TP/108/D

INDEX

A			(British Isles) 111-120
Attachments, towing	91, 96	Distributors, Rover	(Overseas) 121-128
Additives, oil	20	Doors	84
Additives, petrol	3	Draining Coolant	42
Adjustment, brake	53	Dynamo	27, 66
Adjustment, clutch	39	E	
Adjustment, distributor	68	Electrical equipment	64-76
Adjustment, fan belt	42	Engine governor	105
Adjustment, reverse stop	19	Engine timing	36
Adjustment, steering	53	Engine lubrication	21
Adjustment, tappet	38	Engine dimensions	5
Air cleaner	49	F	
Anti-freezing mixture	43	Fan belt adjustment	42
Axles	6, 29	Fault location	77-83
B		Filter, oil, external	26, 27
Brake adjustment	53	Foot pedals	10, 30
Brakes	6, 53	Foot pedal pads	95
Brakes, bleeding	55	Freewheel	6
Battery	64	Front axle lubrication	29
Box, control	67	Front hub lubrication	29
Bulbs	71	Front wheel drive lock	13
C		Frost precautions	43
Cable, high tension	70	Fuel system	5, 44
Capacities (special note)		Fuse	4, 67
	Inside front cover	G	
Capacities	7	Gauge, petrol level	13
Capacity, engine oil	5, 26	Gearbox	6
Capacity, petrol	5, 45	Gearbox lubrication	28
Capacity, water	5, 42	Gear changing	16-19
Capstan winch	104	Gear ratios	6
Carburettor	50	Governor, engine	105
Carrier, spare wheel	95	Guarantee	2
Chaff guard	105	H	
Chassis lubrication	30	Hand-rail, passenger	9
Cleaner, air	49	Heater, vehicle	93
Clutch	6, 39	Hoods	85-90
Clutch adjustment	39	Horn	74
Clutch lubrication	27	Horn button	10
Coil	68	Hub, front, lubrication	29
Controls	10-14	Hydraulic dampers	55
Control box	67	I	
Control, ignition	36	Ignition	5, 68-71
Control, mixture	11, 15	Ignition control	36
Coolant, draining	42	Ignition switch	12
Cooler, oil	106	Ignition warning light	12
Cooling system	5, 40	In case of trouble	77-83
D		Instruments	10
Dampers, hydraulic	55	Instrument panel light switch	12
Decarbonising	35	Introduction	1
Description	7	L	
Dimensions, vehicle	7	Lamps	71-74
Dimensions, engine	5	Lamp dipper switch	10
Dipper switch, lamp	10	Lamp focussing	72
Distributor adjustment	68	Lamp setting	72-73
Distributor lubrication	27	Lamp switch	12
Distributors, Rover		Level gauge, petrol	13

Location of faults	77-83
Location of Solihull factory	129
Lock, front wheel drive	13
Locking	Inside front cover
Lubricants, recommended	32-33
Lubrication	20-30
Lubrication, axles	29
Lubrication, chassis	30
Lubrication, clutch	27
Lubrication, distributor	27
Lubrication, engine	21
Lubrication, front hub	29
Lubrication, gearbox	28
Lubrication, propeller shaft	28
Lubrication, steering box	30
Lubrication, suspension	30
Lubrication, transfer box	28
Lubrication, upper cylinder	3
M	
Maintenance points	31-35
Map of Solihull factory	129
Mixture, anti-freezing	43
Mixture control	11, 15
Nomenclature	Inside front cover
Numbers, vehicle	4
O	
Oil additives	20
Oil capacity, engine	5, 26
Oil cooler	106
Oil filter, external	26, 27
Oil pressure	12, 26
Oil pressure warning light	12, 26, 76
P	
Pad, foot pedal	95
Pedals, foot	10, 30
Petrol system	5, 44
Petrol additives	3
Petrol capacity	5, 45
Petrol level gauge	13
Petrol pump	46
Plugs, sparking	39
Power take-off	96-104
Precautions, frost	43
Pressure, oil	12, 26
Pressures, tyre	57
Propeller shaft lubrication	28
Pulley, rear power take-off	103
Pump, fuel	46
R	
Ratios, gear	6
Rear axle lubrication	29
Recommended lubricants	32-33
Rover distributors	
	(British Isles) 111-120
Rover dealers	(Overseas) 121-128
Running-in period	2
S	
Seats	84
Seats, rear	94

Sediment bowl	45
Setting lamps	72-73
Sidescreens	84
Spare wheel	9, 57
Sparkling plugs	39
Special notes	2
Specification	5
Springs, road	55
Starter	12, 15, 68
Starter switch	12, 15
Starting	15
Station wagon	109-110
Steering	7, 52
Steering box lubrication	30
Suspension	6, 55
Suspension lubrication	30
Switch, dipper lamp	10
Switch, ignition	12
Switch, instrument panel light	12
Switch, lamp	12
Switch, starter	12, 15
Switch, windscreen wiper	13
T	
Towing attachments	91, 96
Tappet adjustment	38
Technical Service	130
Timing	36
Tools	9-10
Trafficators	93
Trailer, Brockhouse	107
Transfer box	6, 13, 18
Transfer box lubrication	28
Transmission	6
Trouble finding	77-83
Tyre pressures	57
Tyres	56-63
U	
Upper cylinder lubrication	3
V	
Vehicle heater	93
Vehicle serial numbers	4
Ventilator, windscreen	95
W	
Warning light, ignition	12, 75
Warning light, mixture	
control	11, 15, 16, 75
Warning light, oil pressure	12, 26, 76
Water system	40
Water capacity	5, 42
Weights	7
Welding plant vehicle	108
Wheels	56-63
Wheel balancing	63
Wheel, spare	9, 57
Winch, capstan	104
Windscreen	9
Windscreen ventilator	95
Windscreen wiper	13, 74
Wiring diagram	Inside rear cover

INTRODUCTION

In the design of the Land-Rover every effort has been made to simplify as far as possible the amount of attention which the owner must devote to upkeep. For this manual we have endeavoured, by the use of illustrations, to make the instructions for items of routine maintenance as simple and as clear as possible. At the same time we realise that there may be occasions when the owner finds himself in some difficulty; such cases are dealt with by our Service Department and the information given on Page 130 will help you.

Operating instructions for the standard vehicle are given on Pages 1-92, while details of extra equipment are set out on Pages 93-106; reference to the Land-Rover Station Wagon is made on Page 109 and to the Welding Plant version on Page 108.



"Occasions when the owner finds himself in some difficulty"

In the event of spare parts being required, they may be obtained through the, nearest Rover agent or in cases where difficulty 'experienced, directly from us. A list of Rover Agents (both Home and Overseas) is given at the back of this book.

It will be realised that from time to time, alterations in design and in the make of various accessories occur and this operation manual, while being kept up-to-date as far as possible, is not to be taken as a standard specification of the Land-Rover.

We reserve the right, to alter the specification at any time and without incurring any obligation to incorporate such alteration in vehicles already delivered.

The purchaser is earnestly requested to fill in the Guarantee form supplied with the vehicle, upon receipt of which we will place his name on our list of owners and return the completed Guarantee form.

THE ROVER Co. Ltd.,
SOLIHULL,
BIRMINGHAM,
ENGLAND.

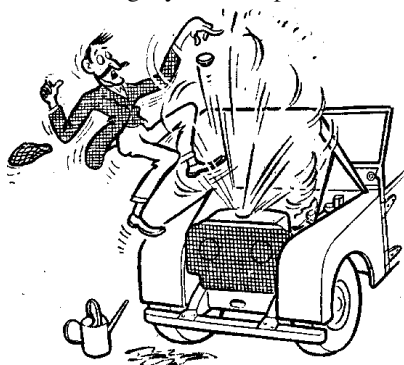
SPECIAL NOTES

GUARANTEE.

In order to obtain the Certificate of Guarantee operative with your vehicle, it is essential that you should, with the minimum of delay, either fill in and post the guarantee form supplied or ask your supplier to do it for you. Failure to do so may seriously jeopardise any claim you may have on the Company under the terms of the standard guarantee.

COOLING SYSTEM.

The cooling system is pressurised and great care must be taken when removing the radiator filler cap, especially when the engine is hot, to avoid steam which may be blown out with considerable force.



"Avoid steam which may be blown out with considerable force"

THE RUNNING-IN PERIOD.

The years of good service expected from your vehicle will depend to a large extent upon the treatment it receives in the early stages. It is most important that your Land-Rover be properly "run-in", that is, it should, be given an initial period of service during which it must be driven carefully at moderate speeds

so that no component is subjected to extreme loads.

We recommend a running-in period of 500 miles (750 Km.) during which 35-40 m.p.h. (55-65 k.p.h.) in high transfer ratio should not be exceeded, but even after that the vehicle should not be driven at prolonged high speeds until it has done 1,000 miles (1,500 Km.); good use should be made of the gearbox and a change-down to a lower gear made if the engine is subjected to hard pulling in a high gear. Never race the engine when cold at any time during the life of the vehicle.

The instructions pasted on the windscreen are only general and to get the most lasting benefit the owner will not only obey these, but also see that he does not, on prolonged stretches, do even 40 m.p.h. (65 k.p.h.) if it means using full throttle during the first 500 miles (750 Km.).

It may well be that you desire to use the Land-Rover for other purposes besides road-work, even when it is new; it may be required for driving, stationary equipment or for cross-country work necessitating low transfer ratio. In the latter case 15 m.p.h. (25 k.p.h.) should not be exceeded in top gear whilst running-in, with correspondingly lower speeds in the intermediate gears. For stationary work an engine speed of 2,000 r.p.m. should be regarded as the maximum during the first five hours and this figure can be raised to 3,000 r.p.m. for the next ten hours. As an engine revolution indicator is not fitted to the Land-Rover, reference should be made to the table below to ascertain the road-speed corresponding to these figures and the hand-throttle marked to give these settings during a trial run on the road.

ENGINE R.P.M.	ROAD SPEED	
	Top gear (high transfer).	Top gear (low transfer).
2,000	30 m.p.h. (50 k.p.h.).	12 m.p.h. (20 k.p.h.).
3,000	46 m.p.h. (70 k.p.h.).	17 m.p.h. (27 k.p.h.).

Your dealer will carry out a complete check-over on the vehicle after 750 miles (1,000 Km.) if used exclusively for road-work or after 30 hours when mainly used in low transfer ratio for farming purposes. The inspection will conform to the Free Service Card supplied with the vehicle and includes changing the oil in the engine, gearbox, transfer box and axles. A second check-over will be given after 1,500 miles (2,500 Km.) or 60 hours.

UPPER CYLINDER LUBRICATION.

During the early life of the vehicle we recommend the use of an upper cylinder lubricant. It should be used in the proportion of one fluid ounce to four gallons of petrol (three centilitres to twenty litres) and added to the tank before filling with petrol to ensure thorough mixing.

We have tested and exclusively recommend the following lubricants:-

Wakefield's Castrollo.

Mobil Upperlube.

Shell Donax U.

or Energol U.C.L.

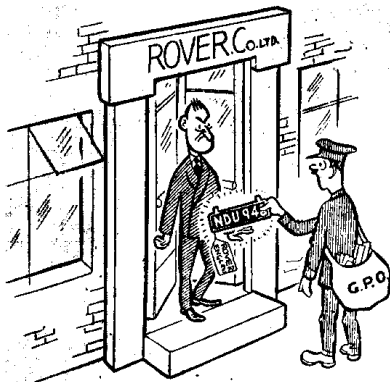
The addition of upper cylinder lubricant is not considered so essential after the engine has been "run-in," but it can be continued without any detrimental effect.

FUSE.

The single fuse fitted in the electrical system protects the horn, windscreen wiper, petrol tank gauge unit and rear stop lights. It is situated under a bakelite cover on the engine side of the scuttle panel on the right-hand side a spare fuse is carried under the same cover. In the event of a failure occurring on any of the components detailed, first examine the fuse to make sure that it has not "blown."



"First examine the fuse"



"The registration number . . . is of no use whatever to us."

VEHICLE SERIAL NUMBERS

The vehicle serial number will be found on a plate fixed to the scuttle panel. Owners are requested to quote this number in all correspondence; the registration number of the vehicle is of no use whatever to us.

Certain units also carry serial numbers as detailed below, but they should not be quoted unless specially asked for, as we can identify them from our records, providing the vehicle number is given.

Chassis number is stamped on the top of the left-hand front engine bearer bracket.

Engine number is stamped at the top front of the cylinder block on the left-hand side, adjacent to the water PUMP.

Gearbox number is stamped on the right-hand side of the casing at the rear.

Rear axle number is stamped on to of the axle casing on the left-hand side.

Front axle number is stamped on top of the axle casing on the left-hand side.

GENERAL DATA AND DIMENSIONS

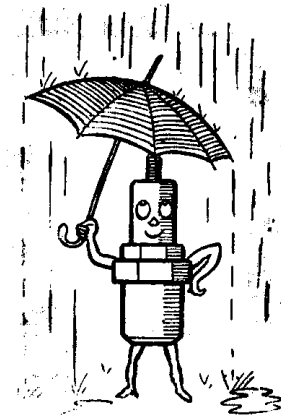
ENGINE. Four cylinders cast en bloc with detachable cylinder head. Flexibly mounted on rubber at four points. Three crankshaft bearings; four cam- shaft bearings. Vibration damper on crankshaft integral with fan driving pulley. Overhead inlet valves operated by followers and push rods; side exhaust valves by direct rockers from camshaft; camshaft is driven by duplex chain automatically adjusted by hydraulic tensioner. Lubrication is full pressure from gear-type oil pump to all bearings and valve gear. External A.C. by-pass pressure filter and a gauze pump intake filter in the sump.

Bore	69.5 mm. (2.736 in.).
Stroke	105 mm. (4.133 in.).
Cylinder capacity	1,595 c.c. (97.34 cu. in.)
Compression ratio	6.8 - 1
B.H.P.	50-55 at 4,000 R.P.M.
R.A.C. Rating	11.98 H.P.
Max. torque	80 lbs. / ft.(11 mKg.) at 2,000 R.P.M.
Firing order	1, 3, 4, 2.
Sump capacity	10 pints (5,5 litres).

COOLING. Impellor type water pump and fan driven from crankshaft. Temperature controlled by thermostat. Pressurised system to decrease loss of coolant under hard working conditions. Total capacity 17 pints (9,75 litres).

IGNITION SYSTEM. Battery and coil. Distributor has both centrifugal and vacuum advance and retard. Waterproof covers on sparking plugs.

FUEL SYSTEM. Petrol from tank under seat-box on right-hand side is delivered to the Solex 32 P.B.I.2 down-draught carburettor by electric S.U. pump. AC. sediment filter between tank and pump. AC. oil-bath air cleaner. Fuel capacity 10 Imperial gallons (45 litres).



*"Waterproof covers on
Sparking Plugs"*

CLUTCH. Single dry plate 9 in. (230 mm.) diameter.

MAIN GEARBOX. Single helical constant-mesh gears, with synchromesh on top and third speeds.

TRANSFER BOX. Two-speed reduction gears on main gearbox output. Incorporates free-wheel unit in front axle drive.

TRANSMISSION. Hardy-Spicer open propellor shafts to front and rear axles.

REAR AXLE. Spiral bevel pattern. Semi-floating axle shafts. Ratio 4.7-1. (4.88-1 for axle numbers up to 861371).

FRONT AXLE. Spiral bevel differential. Drive transmitted through enclosed constant velocity universal joints. Ratio 4.7-1. (4.88-1 for axle numbers up to 861371).

OVERALL GEAR RATIOS. The table below gives the overall gear ratios, i.e., total reduction obtained through main gearbox, transfer box and axles. (Axles numbered 861372 onwards).

MAIN GEARBOX	TRANSFER BOX	
	High ratio.	Low ratio.
Top gear	5.396	13.578
Third	7.430	18.697
Second	11.023	27.738
First	16.165	40.676
Reverse	13.743	84.581

SUSPENSION. Semi-elliptic leaf springs with rubber bushes controlled by telescopic hydraulic dampers.

BRAKES. Girling hydraulic brakes on all wheels. Handbrake applies Girling mechanical brake on transfer box output shaft for parking purposes only.

WHEELS. 16" divided or 16" well-base pattern.

TYRES. 6.00-16 or 7.00-16.

ELECTRICAL SYSTEM. Lucas 12-volt starting and lighting set. Battery 51 A.H. mounted at right of engine well clear ground.

STEERING. Burman worm and nut pattern.

VEHICLE DIMENSIONS.

Overall length		132 in. (3,35 m.).
Overall width		61 in. (1,55 m.).
Overall height	- hood up	70½ in. (1,79 m.).
	- hood down, screen up	65½ in. (1,66 m.).
	- hood down, screen down	53 in. (1,35 m.).
Wheelbase		80 in. (2,03 m.).
Track		50 in. (1,27 m.).
Ground clearance		8½ in. (216 mm.).
Turning circle	(6.00-16 tyres)	35 ft. (10,5 M.).
	(7.00-16 tyres)	40 ft. (12,2 m.).
Weight	- running (with water, oil and fuel)	2,604 lb. (1.136 Kg.).
	- maximum approved gross loaded	4,032 lb. (1.829 Kg.).
Maximum approved pay load (in addition to passengers)		1,000 lb. (450 Kg.).
Maximum draw bar pull	(according to surface conditions).	1,200-2,000 lb. (550 to 900 Kg.).
Internal body dimensions	- length	37½ in. (952 mm.).
	- width	56½ in. (1,43 m.).
	- depth	14½ in. (368 mm.).

CAPACITIES.

Engine sump	10 pints (5,5 litres).
Air cleaner	2 pints (1,0 litre).
Main gearbox	4 pints (2,25 litres).
Transfer box	6 pints (3,5 litres).
Rear axle	3 pints (1,75 litre).
Front axle	3 pints (1,75 litre).
Tracta joints (each)	1 pint (0,5 litre).
Fuel tank	10 Imp. gallons (45 litres)
Cooling system	17 pints (9,15 litres).

DESCRIPTION

The main characteristics of the Land-Rover are brought out in Figs. 1 and 2; there are, however, a few small points which may not be too clear from the illustrations and which require explanation to ensure your obtaining the maximum utility from the vehicle.

The front bumper (A) is retained by bolts and hence readily detachable to facilitate straightening should it become damaged in service.

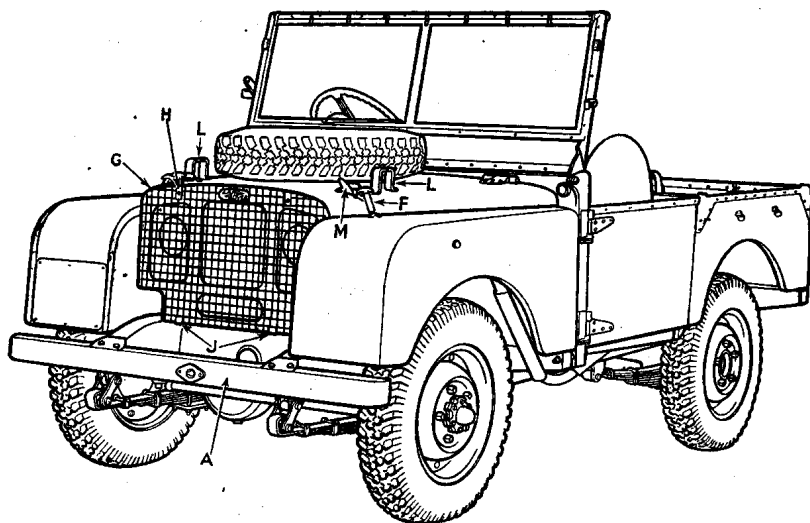


Fig. 1. (Three-quarter front view).

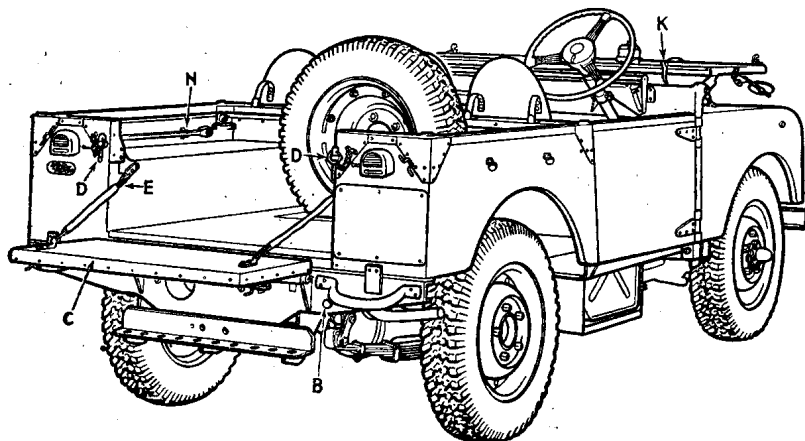


Fig. 2. (Three-quarter rear view).

A-Detachable front bumper.
 B-3-pin socket.
 C-Tailboard.
 D-Tailboard key.
 E-Tailboard chain.
 F-Bonnet fastener.
 G-Radiator grille panel.

H-Grille clamp.
 J-Grille bracket.
 K-Windscreen clamp.
 L-Windscreen support.
 M-Windscreen fastener.
 N-Jack handle clips.

When towing a trailer, connection for the trailer tail and stop lamps are provided by the three-pin-socket (B) fitted in the right-hand side of the rear chassis cross-member. (See "Towing Attachments").

The tailboard (C) can be lowered to its horizontal position by withdrawing the keys (D). To remove the tailboard from the vehicle, unhook the two chains (E), lower it as far as possible and slide off the hinges to the left.

Two spring fasteners (F) secure the bonnet top panel in the closed position; it can be held in the open position by means of the stay rod clipped under the panel on the left-hand side. The panel can be removed from the vehicle by raising it to a vertical position and sliding off its hinges to the left.

The headlamps and horn are protected by the radiator grille (G) which is readily removed by detaching the two bolts and clamps (H), and lifting out from the brackets (J).

The hand-rail mounted on the dash is fitted for the convenience of front seat passengers when traversing rough ground.

Provision is made for folding the windscreen down on to the bonnet (Fig. 2). To do this, release the two clamps (K) from the dash panel and lower the windscreen on to the supports (L); secure in this position by means of the spring fasteners (M). To prevent rattles when not in use, these fasteners are normally clipped to the bonnet panel (Fig. 1).

The spare wheel is stowed in the depression in the body floor (Fig. 2) and retained by means of a clamp and wing-nut. When it is desired to utilise the entire body space for load-carrying the spare wheel can be carried in the alternative position on the bonnet top (Fig. 1). The mounting plate for this purpose is supplied as an extra component. With the spare wheel carried in this way, it is not possible to fold the windscreen into the horizontal position.

The hinged flap in the gearbox cover just to the rear of the main gear change lever affords access to the gearbox oil filler and dip-stick, whilst that in the centre of the seat-box covers the power take-off engagement lever. The locker lid on the right-hand side of the seat-box, encloses the petrol tank and filler (see Fuel System) and the brake fluid reservoir (see Brake System).

TOOLS. The small tools are carried in the locker under the seat-box on the left-hand side. Clips for the starting handle are fitted on the rear of the seat back-rest panel and those (N) for the jack handle on the inside of the left-hand side panel (Fig. 2). When certain items of special equipment are installed, the jack handle is stowed in clips along the dash above the instrument panel.

The standard tool-kit supplied with each vehicle comprises:

Wheel brace	*Adjustable spanner
Lifting jack	*Distributor screwdriver and feeler gauge
Tyre pump	*Spanner (3/8 in.)
Oil gun	*Sparking plug spanner
*Pliers	*Box spanner
*Screwdriver	*Tommy bar
*Open-ended spanner (3/16 in. x 1/4 in.)	*Tyre pressure gauge
*Open-ended spanner (5/16 in. x 7/16 in.)	

Items marked * are contained in a leather tool roll.

CONTROLS AND INSTRUMENTS

The principal controls and instruments are illustrated on the opposite page, where it will be seen that the layout is very similar to that on a normal car, with the addition of gearbox transfer and front wheel drive lock controls.

Except for the positions of the steering column, foot-pedals and handbrake lever, the layout is the same for both left-hand and right-hand drive vehicles.

FOOT PEDALS. The three foot-pedals are normal in position and operation, i.e., the left-hand pedal controls the clutch, the centre pedal the foot brake and the right-hand pedal the accelerator.

HAND-BRAKE. The hand-brake lever protrudes through the front of the seat-box, to the driver's left hand on a R.H.D. vehicle, and to his right hand on a L.H.D. vehicle. In the "off" position it is parallel with the floor; to apply the brake pull the lever upwards; to release, pull up slightly, depress the small knob in the end of the lever and push downwards as far as possible.

STEERING COLUMN. This is positioned either to the right or left-hand side; in both cases, the horn push-button is fitted in the centre of the steering wheel, with the headlamp dipper switch on the wheel boss.

Operation of this switch replaces the primary filaments in both lamps by secondary "out-of-focus" filaments.

MIXTURE CONTROL. The mixture control is situated on the dash to the right, below the instrument panel. It is marked "COLD START" and its operation and also the action of the mixture control warning light are fully described on Page 15. This light is amber in colour and is located in the centre of the instrument panel at the top.

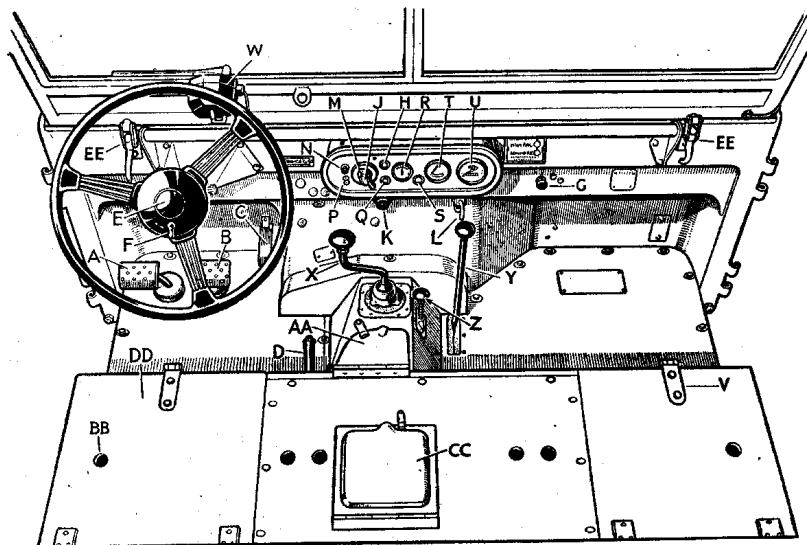


Fig. 3. Controls and instruments.

- | | |
|----------------------------------|--|
| A-Clutch pedal. | R-Ammeter. |
| B-Brake pedal. | S-Oil pressure warning light. |
| C-Accelerator pedal. | T-Petrol level gauge. |
| D-Hand-brake. | U-Speedometer. |
| E-Horn button. | V-Access to petrol filler and brake fluid reservoir. |
| F-Headlamp dipper switch. | W-Windscreen wiper. |
| G-Mixture control. | X-Main gear-change lever. |
| H-Mixture control warning light. | Y-Transfer box change lever. |
| J-Ignition switch. | Z-Front wheel drive lock. |
| K-Starter switch. | AA-Access cover for gear-box filler. |
| L-Slow-running control. | BB-Location hole for seat. |
| M-Lamp switch. | CC-Access cover for power take-off control. |
| N-Instrument panel light switch. | DD-Tool-box. |
| P-Lead lamp socket. | EE-Windscreen clamp. |
| Q-Charging warning light. | |

IGNITION SWITCH. This takes the form of a barrel lock controlled by a small yale-type key, situated in the centre of the main lamp switch on the instrument panel. When the ignition is switched off, the key can be withdrawn.

STARTER SWITCH. The switch operating the starter motor is located on the dash to the left below the instrument panel. To operate, press the knob and release as soon as the engine fires.

SLOW-RUNNING CONTROL. Situated to the right of the starter switch is a slow-running control; by pulling out this control, the engine idling speed may be increased when desired for stationary work. Prior to road Usage, the idling speed should always be returned to normal to facilitate gear changing.

LAMP SWITCH. A rotary type lamp switch is located on the instrument panel; turn the handle until the pointer registers with the required position:- "OFF," "S" (side and tail) or "H" (side, tail and, headlamps).

INSTRUMENT PANEL LIGHT SWITCH. The " push-pull " switch controlling the panel lights is situated at the top left-hand corner of the instrument panel. It is only operative when the ignition is "ON."

LEAD LAMP SOCKET. Below the panel light switch are a pair of sockets which can be used either for a lead lamp or a trickle battery charger. The electrical system being of the "positive earth" variety, the red socket is earthed.

CHARGING WARNING LIGHT. The red warning light at the bottom centre of the instrument panel glows when the dynamo fails to charge, or when the charging rate is lower than the voltage of the battery; in the latter case it will go out when the engine speed is increased above normal idling.

AMMETER. The ammeter is located to the right of the charging warning light.

OIL PRESSURE WARNING LIGHT. The oil pressure warning light to the right of the ammeter glows when, for any reason, the engine oil pressure falls below a safe figure. Should this light, appear during normal operation, stop the vehicle at once and ascertain the cause - usually low oil level in the sump. Never operate the vehicle with low oil pressure as serious damage to the engine will result.

PETROL LEVEL GAUGE. The petrol level gauge will always show ZERO when the ignition is switched off. It must be stressed that, while the gauge will always give a reliable indication of the petrol level, it is not a precision instrument and therefore cannot be employed to derive accurate petrol consumption figures. Such tests should always be made with an auxiliary tank of known size.

PETROL FILLER. The petrol filler cap is located beneath the locker lid on the right-hand side of the seat-box; when the cap is removed, a telescopic tube may be drawn out of the tank neck to facilitate filling. The tank capacity is 10 Imperial gallons (45 litres).

WINDSCREEN WIPER. A windscreen wiper is fitted on the driver's side only. To set the wiper in operation, pull out the horizontal lever a short way and turn it to clear the vertical lever; turn the latter to the right. To park the blade, reverse the operations.

MAIN GEARBOX CONTROL. The main gear-change lever is situated in the centre of the gearbox cover; it has five positions - four forward speeds and reverse. For gear-changing instructions see Pages 16-19.

TRANSFER BOX CONTROL. The transfer box which gives two ratios in the output from the main gearbox (i.e., making eight forward and two reverse speeds in all) is controlled by the lever to the right of the gearbox cover. Push the lever right forward for high ratio and pull right back for low ratio. The lever should be left in the neutral (central) position when using the power take-off pulley for stationary work. On no account must low ratio be selected unless the vehicle is stationary with the clutch depressed. Full instructions for the use of the transfer box are given on Pages 18-19.

FRONT WHEEL DRIVE LOCK. Four-wheel drive is fitted as standard on the Land-Rover. The drive to the front wheels incorporates an over-run freewheel unit which eliminates any undue tyre wear on the front wheels or excessive strain on the transmission when travelling on hard surfaces.

The inclusion of this freewheel means that all four wheels are driving only when the engine is pulling and the vehicle is travelling in a forward direction. When reversing or the engine is coasting with the vehicle travelling forward, the drive is to the rear wheels only. There may be occasions when four-wheel traction is necessary in reverse while operating on soft surfaces or in a forward gear when descending a steep, muddy gradient and provision has therefore been made to "lock" the freewheel unit and so obtain four-wheel drive under such conditions.

The control for this operation (known as the "FRONT WHEEL DRIVE LOCK") takes the form of a knob on the gearbox cover. It is so arranged that the freewheel can only be locked by pressing this knob downwards, when the transfer lever is in 'LOW' ratio; the unit is automatically returned to its normal free condition when the transfer lever is returned to the HIGH position on resuming hard surface travelling.

The control must only be operated when the vehicle is stationary.

Note:- On approximately the first 14,000 vehicles, the control takes the form of a key ring in the right-hand floor board, instead of the knob. Its operation is identical with the later version, except that the ring must be pulled upward about $\frac{1}{4}$ in. (7 mm.) to lock the freewheel unit.

STARTING PROCEDURE

Before attempting to start the engine, read the special notes which follow.

SPECIAL NOTE MIXTURE CONTROL. The mixture control has three positions and there is no graduation between them. The mixture is **NORMAL** when the control is right in as far as it will go. The **WARMING-UP** position can be found by pulling out the control until a light click is felt; it is a little more than half-way out. The **RICH** or **STARTING** position is with the control right out. On no account leave the control in any position between those indicated above and do not forget to push the control right in as soon as the engine temperature will permit. The appearance of the **AMBER WARNING LIGHT** on the instrument panel will indicate that the control has been left out inadvertently and must be pushed right in.

SPECIAL NOTE ACCELERATOR. The carburettor is fitted with an accelerator pump, the action of which is such that if the throttle is fully depressed, an extra rich mixture is provided to assist acceleration. As this is not wanted when starting the engine, except under abnormal starting conditions, **DO NOT TOUCH THE ACCELERATOR PEDAL** at all if the engine is **COLD**. It may assist starting a hot engine if the throttle is opened half-way and released as soon as the engine fires. Never pump the accelerator pedal under any circumstances.

Having read the special notes above, ensure that:-

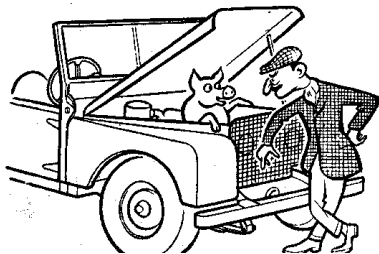
1. The **MAIN GEAR-CHANGE LEVER** is in the **NEUTRAL** position, that is to say, in the midway position between the gears. When in this position it can be moved sideways the full width of the "gate."
2. The **TRANSFER LEVER** is in the **HIGH** gear position i.e., right forward.

Then set the **MIXTURE CONTROL** to suit:-

- (a) right out if the engine is cold.
- (b) in the mid-way position if the engine is warm.
- (c) right in if the engine is hot.

Finally, switch on the **IGNITION**; press the **STARTER BUTTON** and the engine should start up after a turn or two.

FALSE START. If the engine makes a false start when operating the starter button, i.e., fires and does not continue to run, but throws the starter pinion out of mesh, it is imperative to wait until the pinion and flywheel comes to rest before again pressing the starter button; failure to observe this precaution may jam and bend the shaft of the starter motor. Should the engine fail to start after two or three attempts, ascertain why it will not start, or the battery will run down needlessly.



*"Should the engine fail to start . . .
ascertain why."*

WHEN THE ENGINE STARTS. Except under conditions of extreme Cold, the mixture control should be pushed in from the RICH (right out) position to the WARM-UP (mid-way) position within a few seconds of the engine starting. This period may have to be extended if conditions are severe, but should never exceed a minute or so.

Do not race the engine, but it is permissible to drive away at moderate speed, immediately after starting. This, or opening to about quarter-throttle by means of the slow running control if the vehicle is to be used stationary, is definitely advised, as lubrication of the cylinder walls by oil-fling is thereby stimulated as the engine warms up. Continue with the mixture control in the mid- way position until the engine temperature has risen sufficiently to allow the knob to be pushed right in to the NORMAL position. The appearance of the AMBER WARNING LIGHT on the instrument panel will indicate that the control has been left out inadvertently and must be pushed right in at once.

SPECIAL NOTE WARNING LIGHT. Like all mechanical devices the mixture control warning system is not completely fool-proof and the responsibility for pushing the mixture control to the normal position rests with the driver, especially as the warning light may never appear owing to bulb failure. As a guide the engine should always run satisfactorily in the normal position within 1 mile (1 Km.) from starting away.

GEAR CHANGING INSTRUCTIONS

The positions of the main gear change lever are marked on the lever knob. It should be noted that the only reverse stop is a spring in the selector mechanism which tends to hold the lever away from the reverse selector slot.

Throughout the instructions which follow, approximate speeds are quoted at which the various gear-changes should be made. These are given only to serve as a guide to owners who are unaccustomed to the Land-Rover; naturally they can be modified considerably as experience is gained under various operating conditions. At all times care should be taken against "racing" the engine and a "change-up" should be made well before the engine revolutions reach their peak.

Do not drive with the foot resting on the clutch pedal. To 'ride' the clutch in this way causes excessive wear of the withdrawal mechanism.

GEAR CHANGING. (Transfer box in high gear).

CHANGING UP. Assuming, that the engine is running, to start the vehicle from rest proceed as follows:-

Depress the clutch pedal fully, pause for a moment to allow the clutch shaft to stop spinning and then move the gear lever into the first gear position. Release the handbrake by pulling the lever slightly upwards, release the catch by pressing down the knob on top of the brake lever and let the lever go downwards. Accelerate slightly and at the same time allow the clutch pedal to come back until you feel the clutch just gripping. Further gentle pressure of the accelerator will be necessary as the clutch takes up the drive and by this time the clutch should be right in.

After having set the vehicle in motion continue in first gear, speeding up the engine until 5-8 m.p.h. (8-15 k.p.h.) is attained, when second gear should be selected as follows:-

- (i) Depress the clutch pedal fully, at the same time taking the foot off the accelerator pedal.
- (ii) Move the gear lever into neutral.
- (iii) Pause (count " one, two ").
- (iv) Move the gear lever gently into the second 'gear position.
- (v) Release the clutch pedal, at the same time pressing the accelerator pedal gently down.

To change up from second to third speed, continue in second gear until about 15 m.p.h. (25 k.p.h.) is reached. Then depress the clutch pedal fully, at the same time releasing the accelerator, and move the gear lever towards third gear position. It will be found to dwell for a moment, due to the engagement of the synchromesh cones; do not force the lever, but maintain a light pressure on it, and at the correct moment it will slip into third gear, ensuring a silent and easy change. Release the clutch pedal and continue with the acceleration.

Repeat these operations for changing from third to top gear speed of approximately 20-25 m.p.h. (35-40 k.p.h.).

CHANGING DOWN. To change down from top to third gear, depress the clutch pedal and ease the foot off the accelerator; move the gear lever gently but firmly towards third gear position, when the same "dwell" will be felt before third gear engages. Accelerate and let in the clutch.

When changing from third to second and from second to first gear, the double de-clutch method should be used, as the synchromesh mechanism does not operate on these two gears. Proceed as follows:-

- (i) Depress the clutch pedal and move the gear lever into neutral.
- (ii) Let in the clutch and accelerate until the engine speed is judged to correspond with the vehicle speed in the gear to be selected.
- (iii) Again de-clutch and move the gear lever into the required position.
- (iv) Let in the clutch.

Do not snatch or force the gear lever; if the engine speed has been judged correctly, the gear will engage quietly and smoothly.

REVERSE. To reverse the vehicle from a standstill, depress the clutch pedal fully, engage reverse gear position and slowly release the clutch pedal, at the same time gently speeding up the engine by means of the accelerator pedal.

STARTING THE VEHICLE ON AN UPGRADE. When starting on an upgrade is necessary, hold the vehicle with the handbrake and select first gear; depress the accelerator in the normal way whilst simultaneously releasing the handbrake and letting in the clutch.

USE OF THE TRANSFER BOX. The transfer box gives two ratios in the output from the main gearbox, termed "high" and "low," thus giving a total of eight forward and two reverse speeds in all. It is controlled by the lever to the right of the gearbox cover; this has three positions - right forward for high ratio, mid-way for neutral and right back for low ratio.

For normal usage and road work the lever should be in the high position and the foregoing instructions for gear changing apply to this condition.

Low ratio is used when the vehicle is to be operated on heavy ground and for heavy pulling. When low ratio is employed the same instructions for gear changing should be followed except that all the changes must be made at much lower vehicle speeds, i.e., First to second -



"Low ratio is used . . . on heavy ground and for heavy pulling."

within two or three vehicle lengths of starting.

Second to third - 6 m.p.h. (10 k.p.h.).

Third to top - 10 m.p.h. (15 k.p.h.).

The neutral position mid-way between "high" and "low" is quite definite and is used with the power take-off pulley for stationary work; the vehicle cannot be driven with this lever in neutral.

TRANSFER GEAR CHANGING. Changing from HIGH to LOW 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 change lever right back; release the clutch. Should there be any hesitation in the gear engaging, do not force the lever; either rock the vehicle backwards and forwards or, with the engine running, engage a gear in the main gearbox and let in the clutch momentarily; then return the main gear lever to neutral and try the transfer control again.

Changing from LOW to HIGH transfer ratio may be accomplished at any time, regardless of 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.

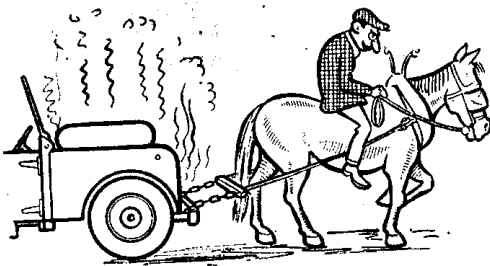
REVERSE STOP ADJUSTMENT. The reverse stop is accessible after removing the inspection cover from the right-hand side of the gearbox cover. In the case of vehicles fitted with a control knob for the front wheel drive lock, it is also necessary to remove the knob and control rod.

When the stop requires adjustment it should be set by means of the screw and locknut on the stop hinge so that:-

- (i) the hinge rides easily up the gear lever when reverse gear is selected and
- (ii) appreciable resistance is felt on moving the gear lever to the reverse position.

LUBRICATION

GENERAL INSTRUCTIONS. One of the, most important factors in the performance and durability of any vehicle is its lubrication. This is especially true of the Land-Rover because of the diverse conditions under which it may be called upon to perform. We are in your hands; not being able to stand over you and see that you put the right lubricant in the right place at the right time, we can only lay down instructions and hope that they will be carried out. You are earnestly advised, however, that the maximum



amount of trouble-free service which you have a right to expect from your Land- Rover will only be obtained if due and regular attention is given to the vital subject of lubrication. The lubricants recommended for use on the Land-Rover will be

found on Page 32, as well as on a plate attached to the radiator baffle. They have been selected only after experimental work on our part in conjunction with the oil refiners; as a result of the tests to which they have been subjected, we find that the oils listed are pre-eminently suitable for the Land-Rover and you are advised to use no other.

In cold weather, starting the engine may prove to be a serious problem if oils heavier than those indicated are used and they would also affect fuel economy and engine life, so when ordering your oil be careful to state the **GRADE** as well as the **MAKE**.

We would advise you that we cannot hold ourselves responsible for damage arising from the use of any additive to our recommended lubricants. The oils we have selected are complete in themselves and afford every protection in use. A warning is necessary against the addition of any oils or other products, as these may materially impair the character of the lubricant in use by dilution and so reduce its viscosity to danger point.

The pages which follow give complete instructions regarding the grade and quantity of lubricant required for all parts of the vehicle; it should be realised, however, that the intervals at which lubrication is carried out must depend largely on the conditions of service under which any individual vehicle is operated. The mileage intervals indicated should be adhered to when your Land-Rover is mainly used for road work, but it is difficult to

quote accurate equivalent time intervals when the vehicle is employed on field work or as a mobile power plant, owing to the diversity of such applications. An attempt has been made to give average intervals in terms of operation hours and these should be followed as a general guide, but in many cases this will largely be a matter that must be left to the good judgement of the operator; obviously in dry dusty weather, certain operations must be carried out much more frequently than during rainy spells.

It should be constantly borne in mind that "over-lubrication," i.e., lubrication attention at comparatively short intervals, cannot do the slightest harm to the vehicle, whereas the converse certainly can (and very often will), seriously shorten its effective service life.

For convenience, the main lubrication points are shown on the plan views at Figs. 4 and 5 and the more important attentions repeated in the "summary of points requiring regular attention." on Pages 31, 34, 35.

ENGINE LUBRICATION

OIL LEVEL

It is necessary that the quantity of oil in the system be kept within specified limits. Since a certain amount of oil is used up in the proper operation of the engine, the supply must be replenished from time to time, this requirement being additional to periodic changing of the oil. The amount of oil used will depend largely, amongst other things, on the speed at which the vehicle is driven.

A dip-stick is provided on the right-hand side of the engine and access to it is gained by lifting the bonnet top panel (Fig. 6). This stick carries two marks, H (High) and L (Low) and the oil level should always be maintained as near the H mark as possible; on no account should it fall below the L mark, in fact it is desirable that this point is not even approached.

Before taking a reading of the oil-level by means of the dip-stick, the vehicle must be placed on level ground and the engine should be stationary long enough to allow the oil to drain back into the sump from the cylinder walls and overhead rocker gear, etc., a process which normally takes about 30 minutes. Remove the dip-stick by pulling it straight upwards out of its socket, making sure that no dirt drops into the sump; wipe the rod clean, re-insert to its full depth and remove a second time to take the reading.



"On no account should it fall below the 'L' mark."

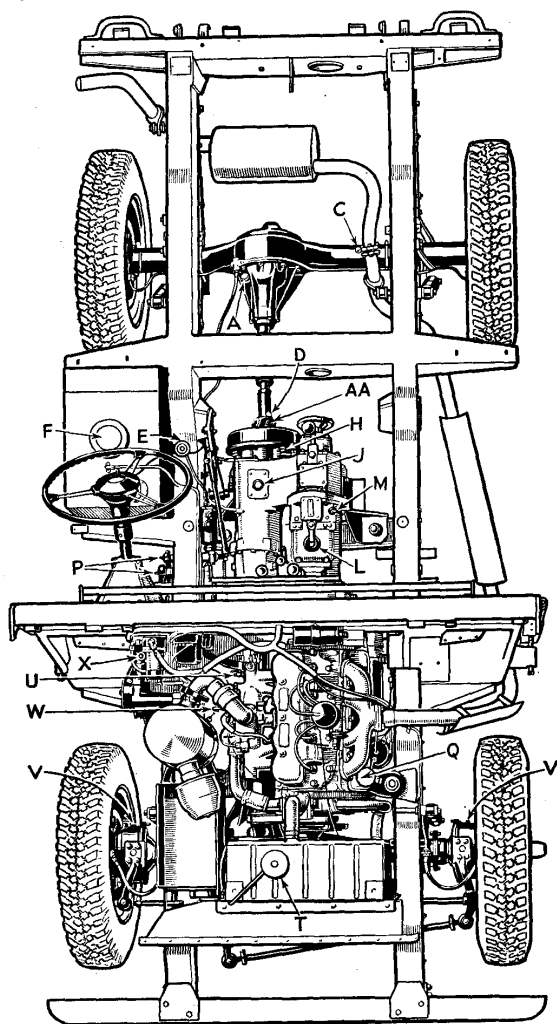


Fig. 4. Upper plan view.

- | | |
|--|----------------------------------|
| A – Rear axle filler. | F – Petrol filler cap. |
| B – Rear axle drain plug. | G – Petrol tank drain plug. |
| C – Rear axle breather. | H – Transmission brake adjuster. |
| D – Propellor shaft sleeve lubrication nipple. | J – Transfer box filler. |
| E – Brake fluid reservoir. | K – Transfer box drain plug. |
| | L – Main gearbox filler. |

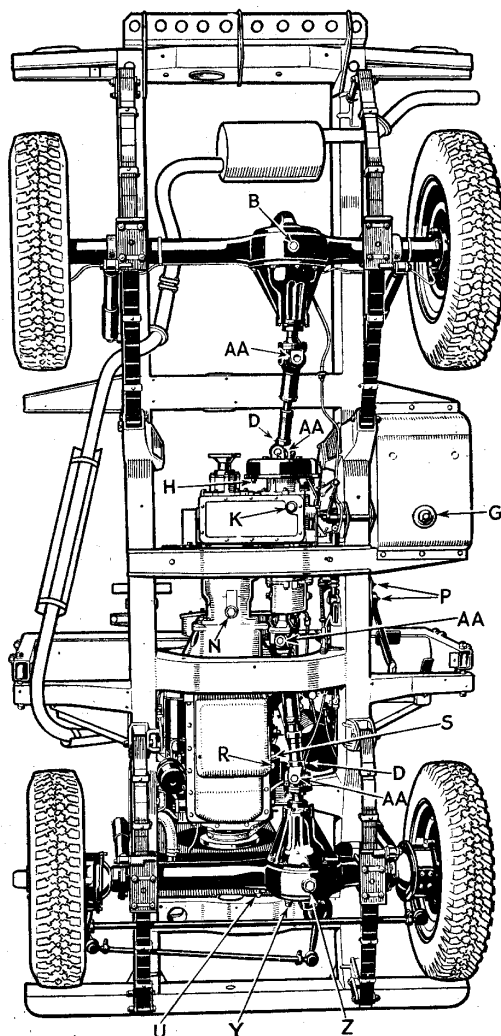


Fig. 5. Lower plan view.

M – Main gearbox dipstick.
 N – Main gearbox drain plug.
 P – Pedal lubricating nipples.
 Q – Engine oil filter.
 R – Engine drain plug.
 S – Engine sump filter.
 T – Radiator filler cap.
 U – Coolant drain tap.

V – Tracta joint level and filler plug.
 W – Engine dipstick.
 X – Steering box filler.
 Y – Front axle filler.
 Z – Front axle drain plug.
 AA – Propellor shaft journal lubrication nipples.

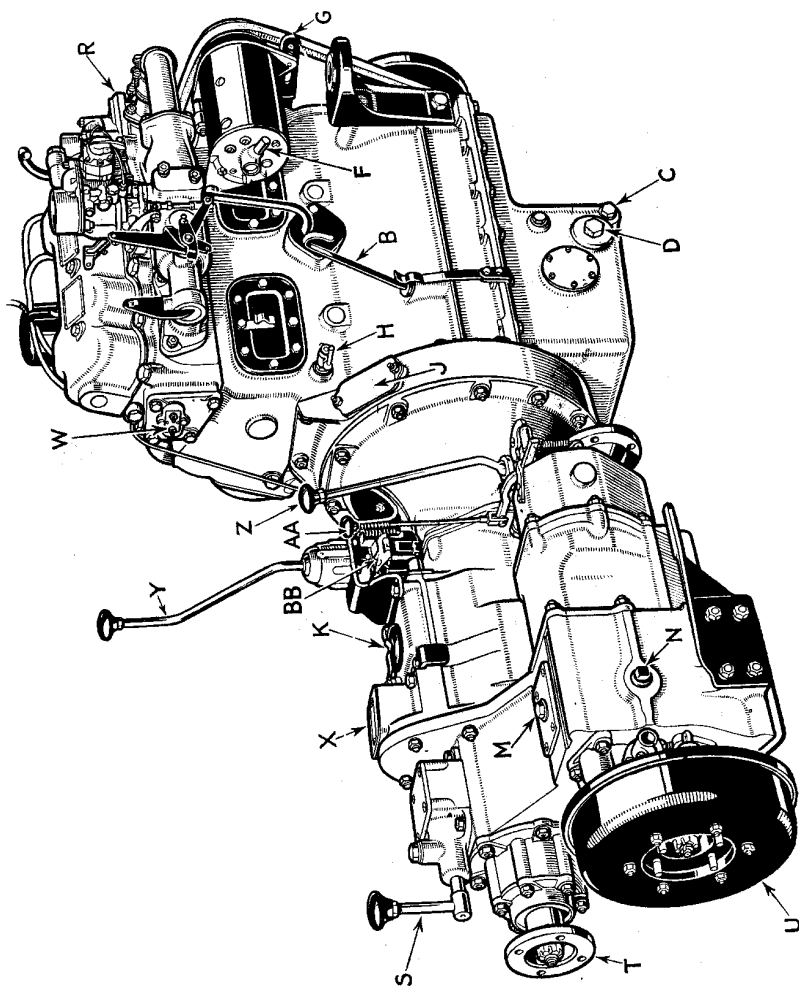


Fig. 6. Engine unit (right hand side).

A – Engine oil filler.
 B – Oil level dipstick.
 C – Oil drain plug.
 D – Gauze Suction oil filter.
 E – By-pass pressure oil filter.
 F – Dynamo lubricator.

G – Fan belt adjustment.
 H – Cylinder block drain tap.
 J – Timing inspection cover.
 K – Main gearbox oil filler.
 L – Gearbox oil level dipstick
 M – Transfer box oil filler.

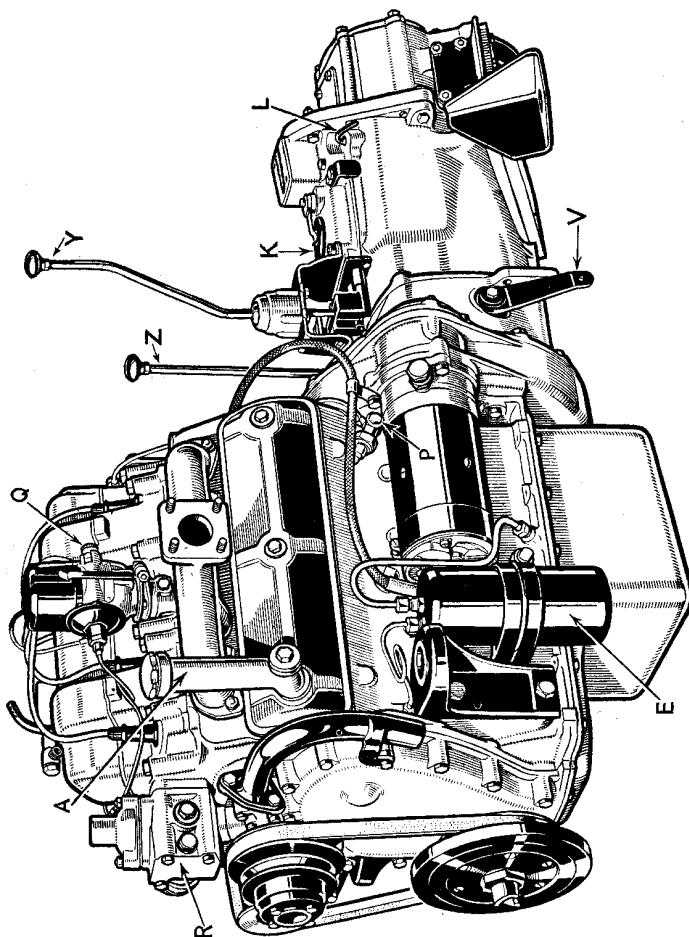


Fig. 7. Engine unit (left hand side).

N – Transfer box oil level plug.	V – Clutch operation lever.
P – Oil pressure warning switch.	W – Mixture control warning light switch.
Q – Ignition control.	X – Main gearbox inspection cover.
R – Thermostat housing.	Y – Main gear change lever.
S – Power take-off control.	Z – Transfer box change lever.
T – Power take-off output.	AA – Front wheel drive lock.
U – Transmission brake (hand brake)	BB – Reverse stop adjustment.

Do not fill beyond the H mark, otherwise you may experience trouble with sooted plugs and the engine may require more frequent decarbonisation than is really necessary.

The engine oil-level should be checked daily in this way and topped up as found necessary.

The oil pressure warning light on the instrument panel will glow when, for any reason, the oil pressure drops below 10 to 12 lb. per sq. in. (0,7 to 0,8 Kg.). It will, therefore, light up when the engine is stationary and will go out when the engine has started and the oil pressure has built up to exceed this figure. Should the warning light appear at any time during normal vehicle operation, the engine must be stopped immediately and the cause ascertained; usually it will be due to low oil level in the sump.

ENGINE OIL CHANGES

Except under tropical or severe winter conditions, it is recommended that the oil placed in the crankcase by the manufacturer be used for the first 750 miles (1.000 Km.) or 25 hours. Under such conditions, the engine oil should be changed immediately upon receipt of the vehicle to the appropriate grade as shown in this manual. At 750 miles (1.000. Km.), or 25 hours the oil should be changed.

Thereafter, under good ROAD conditions, the engine oil need only be changed at intervals of 3,000 miles (5.000 Km.) provided that the EXTERNAL OIL FILTER is changed at every 9,000 miles (15.000 Km.).

When the vehicle is used primarily for industrial or dusty FIELD work, the oil should be changed at each 75 hours, provided that the EXTERNAL OIL FILTER is changed at every 300 hours.

It cannot be too strongly emphasised that, should the oil filter not be replaced at these intervals, the engine oil must be changed more frequently.

DRAINING THE SUMP.

The engine oil is drained by removing the plug in the bottom of the sump on the right-hand side. First run the engine to get the oil well warmed up, remove the plug and allow plenty of time for the dirty oil to drain completely away. Replace the plug and refill the engine by adding oil of the correct grade through the filler cap on the left-hand side. The sump capacity is 10 pints (5,5 litres).

At the same time it is advisable to inspect the gauze intake filter in the sump and if necessary, clean it by washing in petrol.

The filter can be detached without removing the sump by unscrewing the large brass plug on the right-hand side of the sump (Fig.6).

EXTERNAL OIL FILTER.

In addition to the coarse gauze suction filter in the sump, the oil is cleaned by means of an AC. type ZS1 pressure filter mounted externally on the engine. This filter continually cleans a proportion of the oil drawn from the front end of the bearing gallery pipe, the return being direct to the sump by external pipeline (Fig. 7).

It should be renewed at intervals not exceeding 9,000 miles (15.000 Km.) if the vehicle is used primarily on the road and at every 300 hours if it is used mainly for field work.

WATER PUMP.

The water pump bearings are pre-packed with grease and require no further lubrication.

DYNAMO.

At about every 18,000 miles (30.000 Km.) or 500 hours, unscrew the lubricator at the end of the dynamo (Fig. 6), lift out the felt pad and spring and about half fill the lubricator with high melting-point grease. Replace the spring and felt pad.

DISTRIBUTOR.

Every 3,000 miles (5.000 Km.) or 100 hours, lubricate the distributor as follows:

- (i) Lightly smear the cam with clean engine oil.
- (ii) Lift off the rotor and add a few drops of thin machine oil to lubricate the cam bearing and distributor shaft. Replace the rotor and push it on to the shaft as far as possible.
- (iii) Add a few drops of thin machine oil through the hole marked "OIL HERE" in the contact-breaker base plate, to lubricate the automatic timing control.
- (iv) Place a small amount of clean engine oil on the contact breaker lever pivot. Do not allow oil to get on to the contacts.

CLUTCH LUBRICATION.

The clutch withdrawal mechanism is lubricated from the gearbox; hence no individual attention is required.

MAIN GEARBOX LUBRICATION.

Under extreme winter conditions, the oil should be changed on receipt of the vehicle to the appropriate grade.

Every 1,000 miles (1.500Km.) or 30 hours, the main gearbox oil level should be checked and replenished as necessary. The dip-stick and filler cap on top of the gearbox are accessible through the cover plate on the gearbox cover in front of the seat-box; the level should be kept up to the "H" mark on the stick (Fig. 7).

The oil should be drained off after the first 750 miles (1.000 Km) or 25 hours and thereafter at each 3,000 miles (5.000 Km.) or 100 hours, by removing the plug in the bottom of the gearbox casing (Fig. 5). Refill with the correct grade; the capacity is approximately 4 pints (2,25 litres).

It is advisable to drain off the oil after a run when the unit is warm, as draining will then be faster and more complete.

TRANSFER BOX LUBRICATION.

The transfer box, transfer case and freewheel are lubricated as one unit, through a filler plug situated on the top panel of the transfer box (Fig. 6).

Under extreme winter conditions, the oil should be changed on receipt of the vehicle to the appropriate grade.

Check the oil level every 1,000miles,(1.500Km.) or 30 hours by removing the level plug on the right-hand side of the box; this should be done immediately after a run when the unit is warm; if any oil runs out of the plug hole, allow it to do so, but if the level is low, add oil of the correct grade through the filler hole until it reaches the bottom of the level hole. Replace both plugs securely.

The oil should be completely drained after the first 750 miles (1.000 Km.). or 25 hours and thereafter at every 3,000 miles (5.000 Km.) or 100 hours by removing the plug in the bottom of the transfer box housing (Fig. 5). Refill with new oil to the bottom of the level hole; the total. capacity of the unit is 6 pints (3,5 litres).

FRONT AND REAR PROPELLER SHAFT LUBRICATION.

Lubrication nipples are provided on the sliding portions of the front and rear propeller shafts (Fig. 5). Every 1,000 miles (1.500 Km.) or 30 hours apply one of the recommended oils at these two points, using the oil gun provided in the tool kit.

Lubrication nipples are also fitted to the propeller shaft universal joints. Every 3,000 miles (5.000 Km.) or 100 hours, apply the correct grade of oil at these four points, preferably using the oil gun provided in the tool kit. If high pressure greasing equipment is used, great care must be taken not to damage the seals in the joints.

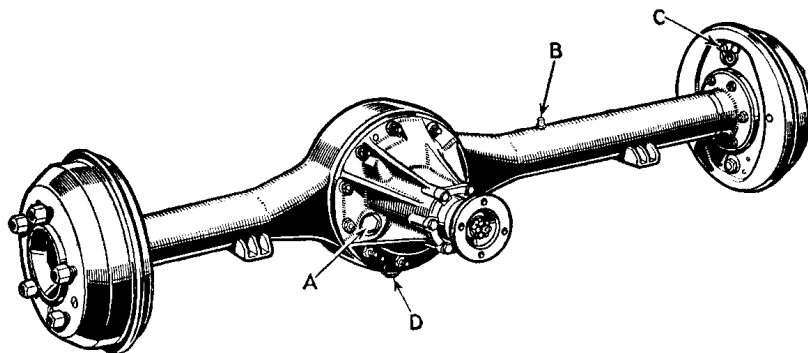


Fig. 8 Rear axle.

A – Oil filler/level plug.

B – Breather.

C – Brake bleed nipple.

D – Oil drain plug.

FRONT AND REAR AXLE LUBRICATION.

Under extreme winter conditions, the oil should be changed on receipt of the vehicle to the appropriate grade.

While it is necessary to make sure that the axles receive sufficient lubrication, it is important to avoid an excess of oil. This is especially so in the case of the rear axle, where the oil may reach the brake shoes and cause a serious loss in braking efficiency.

The oil levels should be checked at each 1,000 miles (1,500 Km.) or 30 hours, immediately after a run when the axles are warm. Remove the combined level and filler plug from the axle casing banjo (on the right-hand side on the rear axle and at the front on the front axle - Figs. 8 and 9); if any oil runs out, allow it to do so, but if the level is low, add oil of the correct grade, using a syringe or suitable funnel, until it reaches the bottom of the filler hole. Replace the plug securely.

The oil should be completely drained after the first 750 miles (1,000 Km.) or 25 hours and thereafter at every 3,000 miles (5,000 Km.) or 100 hours by removing the plug in the bottom of the axle casing. Refill with new oil to the bottom of the filler hole; the total capacity of each unit is approximately 3 pints (1,75 litre).

NOTE:- A second oil filler/level plug is provided on the front axle at the rear of the differential casing; this is rather inaccessible on the vehicle, so that usually the front plug will always be used.

TRACTA JOINT, SWIVEL PIN AND FRONT HUB LUBRICATION.

The Tracta joints, swivel pins and front hubs receive their lubrication from common housings, the combined level and filler plugs being located at the rear of the joint housings on the centreline of the axle (Fig.10).

Check the oil level in each joint at every 1,000 miles (1,500 Km.) or 30 hours by removing the plug immediately after a run when the unit is warm; if any oil runs out, allow it to do so, but if the level is low, add oil of the

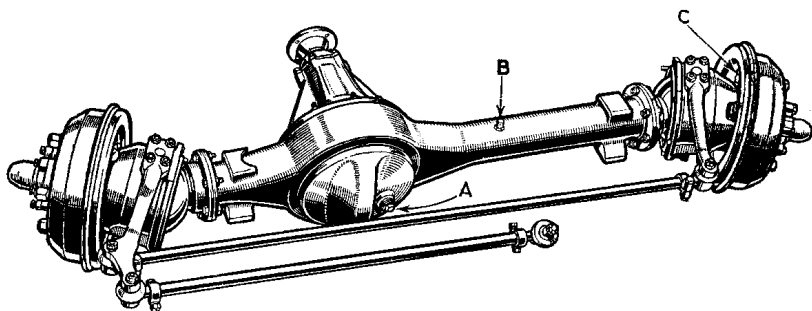


Fig. 9. Front axle (front view).

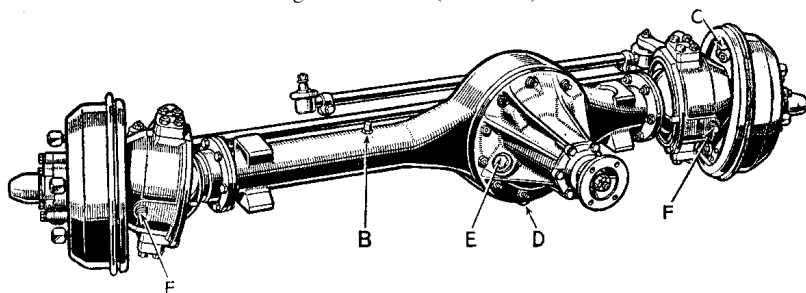


Fig. 10. Front axle (rear view).

A – Axle filler/level plug.

B – Breather.

C – Brake bleed nipple.

D – Oil drain plug.

E – Axle secondary filler/level plug.

F – Tracta joint filler/level plug.

correct grade, using a syringe or oil-gun, until it reaches the bottom of the filler hole. Replace the plug securely. The total capacity of each unit is approximately 1 pint (0,5 litre).

STEERING LUBRICATION. The only component in the steering system requiring any lubrication attention is the steering box itself; the ball-joints and steering relay shaft are pre-packed with grease or oil and need no lubrication for the life of the vehicle, except in cases of repair after accidental damage or when dismantled for any other reason.

An oil filler plug for the steering box will be found on top of the steering column just above the box. Every 1,000 miles (1.500 Km.) or 30 hours, remove the filler plug and add oil of the correct grade as required to bring the level to the bottom of the filler neck. Replace the plug securely.

SUSPENSION LUBRICATION. The road springs are mounted on rubber bushes which require no lubrication.

CHASSIS LUBRICATION. The only points on the chassis requiring lubrication attention are the brake and clutch pedal shafts, which are provided with Tecaemit grease nipples (Fig. 4). Every 3,000 miles (5.000 Km.) or 100 hours apply one of the recommended greases at these two points, using the grease gun provided in the tool kit.

SUMMARY OF POINTS REQUIRING REGULAR ATTENTION

Use only the recommended lubricants listed on the two following pages.

These maintenance items are listed for the main part on a mileage basis, but it will be appreciated that in many cases the necessity for attention is also related to running hours, especially where the vehicle is used largely for driving stationary equipment or slow-speed agricultural work.

Throughout the summary, page references are given on which the item concerned is dealt with at length and, where applicable, some indication of time interval is given. It is therefore most important that attention be transferred to these pages at appropriate points.

DAILY:

Before starting the engine, check:

1. Level of oil in the engine sump. (Page 21)
2. Level of water in radiator. (Page 43).

WEEKLY:

1. TYRES. Check pressure and inflate if necessary (Page 57).
Examine tyres, for cuts and damage and remove any embedded flints, etc.
2. WHFELS. Check wheel nuts for tightness.
3. BRAKES. Check the level of fluid in the hydraulic reservoir and replenish if necessary. (Page 54).

AT FIRST 750 MILES (1.000 Km.):

1. Your dealer will carry out the first service check-over as detailed on the Free Service Card supplied with the vehicle.

EVERY 1,000 MILES (1.500 Km.):

1. BATTERY. Check the acid level and replenish as necessary. (Page 64).
2. GEARBOX AND TRANSFER BOX. Inspect the oil levels and replenish as necessary. (Page 28).
3. FRONT AND REAR AXLES. Inspect the oil levels and replenish as necessary. (Page 29).
4. TRACTA JOINTS. Inspect the oil levels and replenish as necessary. (Page 29).

Continued on Pages 34-35.

RECOMMENDED LUBRICANTS – I

Components and Conditions		VACUUM		WAKEFIELD		ESSO		Classification
		Agricultural	Car	Agricultural	Car	Agricultural	Car	
ENGINE	Extreme Winter (below 10° F.)	-	Mobiloil Arctic Special	Agricastrol Z	Castrol Z	Essolube 10	Essolube 10	S.A.E. 10W
AIR CLEANER	Winter (10° F. to 32° F.)	Tractor Oil 620	Mobiloil Arctic	Agricastrol LT	Castrolite	Essolube 20	Essolube 20	S.A.E. 20W
AND	Summer (32° F. to 90° F.)	Tractor Oil 630	Mobiloil A	Agricastrol Medium	Castrol XL	Essolube 30	Essolube 30	S.A.E. 30
GOVERNOR	Tropical (above 90° F.)	Tractor Oil 640	Mobiloil AF	Agricastrol Heavy	Castrol XXL	Essolube 40	Essolube 40	S.A.E. 40
UPPER CYLINDER LUBRICANT		Mobil Upperlube	Mobil Upperlube	Castrollo	Castrollo	-	-	-
GEARBOX AND TRANSFER CASE	Normal (above 10° F.)	Tractor Oil 650	Mobiloil D	Agricastrol Heavy	Castrol XXL	Essolube 50	Essolube 50	S.A.E. 50
	Extreme Winter (below 10° F.)	-	Mobiloil CW Special	Agricastrol Medium	Castrol XL	Gear Oil 80	Gear Oil 80	S.A.E. 80 Gear Oil or S.A.E. 30 Engine Oil
DIFFERENTIALS AND TRACTA JOINTS	Normal (above 10° F.)	Tractor EP Gear Oil	Mobilube GX90 or Mobilube EPW	Agricastrol Gear Oil EP	Castrol Hi-press	Expee Compound 90	Expee Compound 90	S.A.E. 90EP
	Extreme Winter (below 10° F.)	-	Mobilube GX80	Agricastrol Gear Oil EP	Castrol Hypoy 80	Expee Compound 80	Expee Compound 80	S.A.E. 80EP
STEERING BOX AND LUBRICATION NIPPLES	Normal (above 10° F.)	Tractor Gear Oil 140	Mobilube C	Agricastrol Gear Oil Medium	Castrol D	Gear Oil 140 Heavy	Gear Oil 140 Heavy	S.A.E. 140
	Extreme Winter (below 10° F.)	-	Mobilube CW Special	Agricastrol Gear Oil Medium	Castrol ST	Gear Oil 80	Gear Oil 80	S.A.E. 80 Gear Oil or S.A.E. 30 Engine Oil
STEERING RELAY LEVER (SEALED)		Tractor Gear Oil 140	Mobilube C	Agricastrol Gear Oil Medium	Castrol D	Gear Oil 140 Heavy	Gear Oil 140 Heavy	S.A.E. 140
REAR POWER TAKE-OFF AND PULLY UNIT		Tractor Oil 620	Mobilube Arctic	Agricastrol Light	Castrolite	Essolube 20	Essolube 20	S.A.E. 20W
CAPSTAN WINCH		Tractor Oil 640	Mobilube AF	Agricastrol Heavy	Castrol XXL	Essolube 40	Essolube 40	S.A.E. 40

NOTE: 10° F. = -12° C.; 32° F. = 0° C.; 90° F. = 32° C.

Wherever possible, the “Agricultural” grades of lubricant should be used; the corresponding “Car” grades are shown as alternatives when they are not obtainable. If neither of these grades is available, good quality oils corresponding to the S.A.E. numbers may be used.

RECOMMENDED LUBRICANTS – II

Components and Conditions		PRICE'S		SHELL		Classification
		Agricultural	Car	Agricultural	Car	
ENGINE AIR CLEANER AND GOVERNOR	Extreme Winter (below 10° F.)	Olympia 10	Energol S.A.E. 10	-	X.100-S.A.E. 10 or Silver Shell	S.A.E. 10W
	Winter (10° F. to 32° F.)	Olympia F	Energol S.A.E. 20	Tractor Oil 20	X.100-S.A.E. 20 or Single Shell	S.A.E. 20W
	Summer (32° F. to 90° F.)	Olympia M	Energol S.A.E. 30	Tractor Oil 20	X.100-S.A.E.30 or Double Shell	S.A.E. 30
	Tropical (above 90° F.)	Olympia Y	Energol S.A.E. 40	Tractor Oil 20	X.100-S.A.E. 40 or Double Extra Shell	S.A.E. 40
UPPER CYLINDER LUBRICANT		Energol U.C.L.	Energol U.C.L.	Donax U	Donax U	-
GEARBOX AND TRANSFER CASE	Normal (above 10° F.)	Olympia O	Energol S.A.E. 60	Tractor Oil 50	X.100-S.A.E. 50 or Triple Shell	S.A.E. 50
	Extreme Winter (below 10° F.)	Olympia Y	Energol S.A.E. 40	Tractor Oil 30	X.100-S.A.E. 30 or Double Shell	S.A.E. 80 Gear Oil or S.A.E. 30 Engine Oil
DIFFERENTIALS AND TRACTA JOINTS	Normal (above 10° F.)	Olympia EP	Energol EP S.A.E. 90	EP Tractor Gear Oil S.A.E. 90 EP	Spirax 90 EP	S.A.E. 90EP
	Extreme Winter (below 10° F.)	-	Energol EP S.A.E. 80	-	Spirax 80 EP	S.A.E. 80EP
STEERING BOX AND LUBRICATION NIPPLES	Normal (above 10° F.)	Olympia Gear D.K.	Energol S.A.E. 140	Tractor Gear Oil S.A.E. 140	Spirax C-S.A.E. 140 or Dentax 140	S.A.E. 140
	Extreme Winter (below 10° F.)	Olympia Amber	Energol S.A.E. 90	Tractor Oil 30	X.100-S.A.E. 30 or Double Shell	S.A.E. 80 Gear Oil or S.A.E. 30 Engine Oil
STEERING RELAY LEVER (SEALED)		Olympia Gear D.K.	Energol S.A.E. 140	Tractor Gear Oil S.A.E. 140	Spirax C-S.A.E. 140 or Dentax 140	S.A.E. 140
REAR POWER TAKE-OFF AND PULLY UNIT		Olympia F	Energol S.A.E. 20	Tractor Oil 20	X.100-S.A.E. 20 or Single Shell	S.A.E. 20W
CAPSTAN WINCH		Olympia Y	Energol S.A.E. 40	Tractor Oil 40	X.100-S.A.E. 40 or Double Extra Shell	S.A.E.40

NOTE: 10° F. = -12° C.; 32° F. = 0° C.; 90° F. = 32° C.

Wherever possible, the “Agricultural” grades of lubricant should be used; the corresponding “Car” grades are shown as alternatives when they are not obtainable. If neither of these grades is available, good quality oils corresponding to the S.A.E. numbers may be used.

5. STEERING BOX. Remove the filler plug and top up with oil as required (Page 30).
6. PROPELLER SHAFTS. Lubricate the nipples on the sliding joints (Page 28).
7. BRAKES. Adjust as necessary. (Pages 53-55).

AT FIRST 1,500 MILES (2.500 Km.):

1. Your dealer will carry out the second service check-over as detailed on the Free Service Card supplied with the vehicle.

EVERY 3,000 MILES (5.000 Km.):

1. ENGINE. Drain the sump, clean the gauze intake and refill with fresh oil. (Page 26).
Clean and refill the air cleaner. (Page 50).
2. SPARKING PLUGS. Inspect and re-set gaps to .023-.026 in. (0,60-0,65 mm.) if necessary.
3. TAPPETS. Check tappet adjustment. (Page 38).
4. DISTRIBUTOR. Lubricate as described on Page 27.
5. DYNAMO AND FAN BELT. Check tension and adjust as required. (Page 42).
6. CLUTCH. It is important to see that correct free movement is maintained at the pedal pad. Adjust as required. (Page 39).
7. GEARBOX AND TRANSFER BOX. Drain off the oil and refill with fresh lubricant. (Page 28).
8. FRONT AND REAR AXLES. Drain off the oil and refill with fresh lubricant. (Page 29).
9. FRONT AND REAR AXLES. Check tightness of U-bolts securing the axles to the springs.
10. PEDALS. Lubricate the nipples or the pedal spindles. (Page 30).
11. WHEELS. Change round all wheels to give them equal spells of duty. (Page 57).
12. PROPELLER SHAFTS. Lubricate the journal nipples (Page 28).

EVERY 6,000 MILES (10.000 Km.):

1. FUEL SYSTEM. Clean sediment bowl and fuel pump filter. (Pages 45 and 46).
2. DISTRIBUTOR. Clean and check as described on Page 68.
3. BRAKES. If the brakes have been harshly used, relining may be desirable.

EVERY 9,000 MILES (15.000 Km.).

1. ENGINE. Replace the AC. external oil filter. (Page 27).

EVERY 18,000 MILES (30.000 Km.):

1. DYNAMO. Lubricate as described on Page 27.

GENERAL. A few spots of oil should be applied to all exposed joints, such as throttle joints, brake joints, door locks and hinges, etc., as frequently as possible - at least once every month. At the same time it is a sound practice to look over such points as wiring (where this is exposed), brake pipes and control rods for signs of chafing which might cause "shorts" or leaks.

DECARBONISING

It is not possible to lay down any hard and fast rule concerning the mileage intervals at which the engine should be decarbonised and the valves ground in, for it is not actually necessary to carry out the operation until there is a "fall-off" in performance. As that condition is not always readily detected under varying conditions of service, your nearest Rover dealer will always be pleased to advise you on the matter. If you are in any doubt at all, it is far better to depend upon mileage as your guide and decarbonise and grind in the valves every 9,000 miles (15.000 Km.). In cases where the vehicle is used almost exclusively for 'stationary work, decarbonising should be carried out at intervals of 300-500 hours.

ENGINE TIMING

OCTANE SELECTOR.

The timing of the ignition is controlled automatically by mechanism in the distributor. In addition, an octane selector is fitted. This is a vernier adjustment attached to the distributor (Fig. 7) fitted with a sliding portion controlled by an adjusting screw and a calibrated scale marked R (retard) and A (advance) with a number of divisions between. The standard setting for the ignition is with the long line of the scale on the sliding portion against the mark on the selector body, thus leaving one division further possible advance and four divisions retard.

This setting is correct for any normal fuel and with a clean engine, but should pinking develop as a result of the need for decarbonising, the control can be retarded a little by turning the screw in an anti-clockwise direction. Do not forget to return it to the original position after decarbonising.

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

FLYWHEEL MARKINGS.

The flywheel markings and timing pointer are visible when the inspection cover on the right-hand side of the flywheel housing is removed. (Fig. 6).

The markings and their meanings are as follows:-

- (1) The line against which the letters T.D.C. are stamped, when brought dead opposite the pointer, means that No. 1 piston is on Top Dead Centre, i.e., at the top of its stroke.
- (2) The line against which the letters F.A.15° are stamped, when set opposite the pointer, indicates the firing-point of No. 1 cylinder when the octane selector is set in the standard position on the sliding scale (i.e., the point at which the distributor points should be just opening, with the rotor in the firing position for No. 1 or No. 4 cylinder). It is 15° before T.D.C. (4 flywheel teeth). *Disregard the other F.A. marks at 7°, 8°, and 11° on certain flywheels.*
- (3) The line against which the letters E.P. are stamped, when set opposite the pointer, indicates the point at which No. 1 exhaust valve should be at the peak of its lift (fully open). It is 114° before T.D.C. (31 flywheel teeth).

VALVE TIMING.

If the timing chain and hydraulic tensioner should have been removed, the procedure to re-time the engine is as follows (See Fig. 11).

- (1) Set the exhaust tappets as instructed on Page 38 and slacken the inlet tappet adjusting screws as far as possible.
- (2) Rotate the camshaft in the running direction until No. 1 exhaust valve is fully open.

The use of a dial indicator is the only reliable method of determining this point. It should be mounted on a stud adjacent to No. 1 exhaust rocker and with its aid the possibility of an error in determining the exhaust peak is eliminated. It is possible to

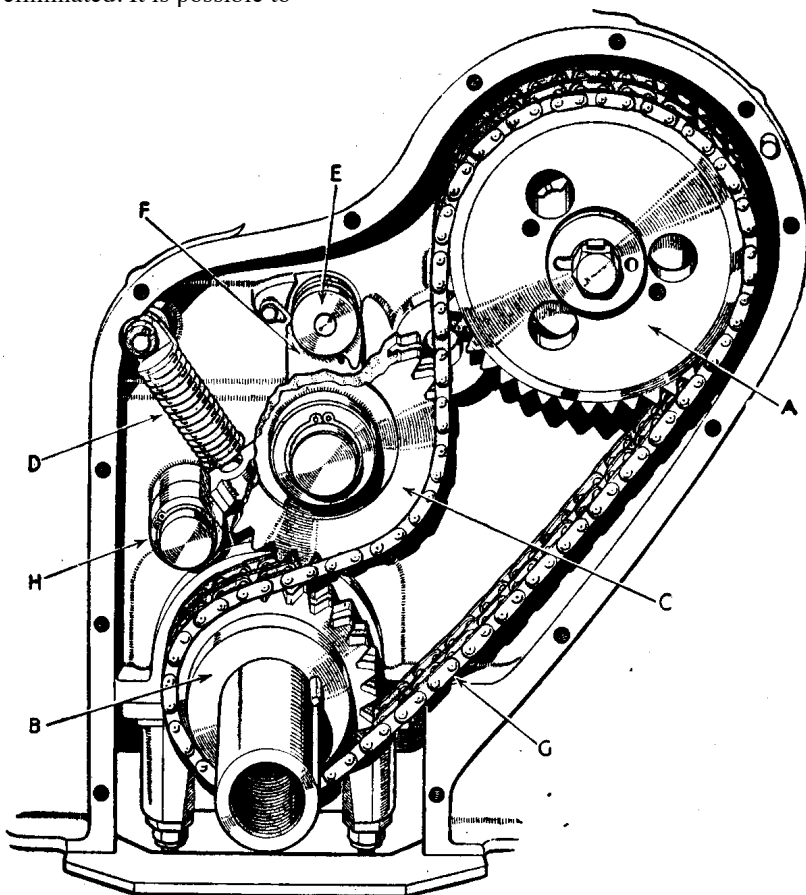


Fig. 11 Timing Gears

A – Camshaft chainwheel
B – Crankshaft chainwheel
C – Jockey pulley
D – Hydraulic tensioner

E – Pawl
F – Ratchet
G – Timing chain (driving side)
H – Jockey pulley arm

do the job correctly without a dial indicator, but much time is wasted and the possibilities of an error very much magnified.

- (3) Rotate the engine in the running direction until the E.P. mark oil the flywheel is in line with the pointer.
- (4) Fit the timing chain, ensuring that there is no slack on the driving side (G).
- (5) Hold the ratchet pawl (E) clear and replace the complete pulley (C, F and H), meshing the pulley with the chain.
- (6) Check the timing and correct if necessary. The camshaft chainwheel (A) is made with three irregularly spaced keyways, so that if the timing will not come correct in the first position tried, alternatives are provided.
- (7) Replace the hydraulic tensioner (D), comprising cylinder, piston and spring; these items must be assembled dry to prevent the formation of an air lock. Retain at its upper end with a split pin. Fit the circlip at (H), retaining the jockey pulley assembly. Engage the ratchet (E, F).
- (8) Set the inlet tappets as instructed below.

IGNITION TIMING.

- (1) Check the contact breaker clearance and adjust if necessary using the combined feeler gauge and screwdriver supplied in the tool kit. The correct gap with the points fully open is .012 in. (0,30 mm).
- (2) Rotate the engine in the running direction until the FA15° mark on the flywheel is in line with the pointer, with both valves on No. 1 cylinder closed.
- (3) The rotor of the distributor will now correspond with No. 1 cylinder high tension lead terminal.
- (4) Set the octane selector to the standard position on the sliding scale.
- (5) Set the distributor points just breaking by slackening the ¼ in. pinch bolt at the base of the distributor head and rotate the distributor bodily in the required direction. Do not forget to re-tighten the pinch bolt.

TAPPET ADJUSTMENT.

The firing order is 1, 3, 4, 2. The correct tappet clearance is .010 in. (0,25mm.) on the inlet valves and .012 in. (0,30 mm.) on the exhaust valves, with the engine either cold or at running temperature. Adjustment for this clearance is provided by a set-screw and lock-nut on the rocker. (See Figs. 12 and 13). When adjustment is required, slacken the lock-nut and rotate the

set-screw to give the correct clearance by means of a screw- driver. The lock-nut should be securely tightened after adjustment, great care being taken to ensure that this operation does not upset the clearance.

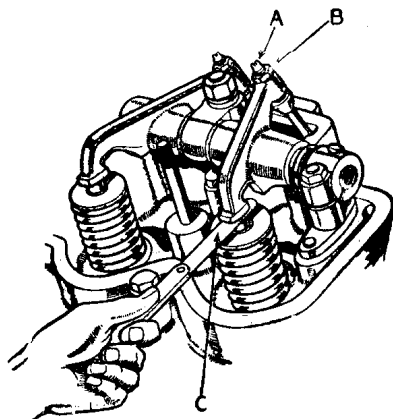


Fig. 12. Inlet tappet adjustment

A – Tappet adjusting screw B – Lock nut C – Feeler gauge

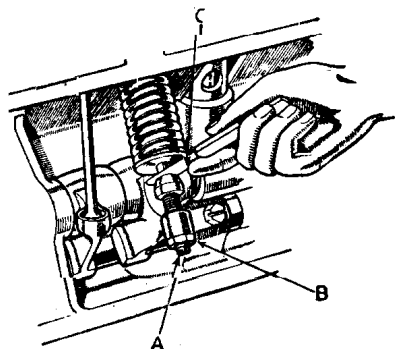


Fig. 13. Exhaust tappet adjustment

The tappet clearance should be set with the engine either cold or at running temperature and it is essential to ensure that the valve to be adjusted is really closed. To do this, set the valve receiving attention fully open and then move the engine one complete turn to bring the tappet on to the back of the cam. It cannot be urged too strongly that the clearance must be correct if the best results are to be obtained.

SPARKING PLUGS.

Lodge HLNK sparking plugs are fitted as standard equipment. Every 3,000 miles (5,000 Km.) or 100 hours, the plugs should be removed and cleaned and the electrode gaps re-set to .023-.026 in. (0,60-0,65 mm.) if necessary.

CLUTCH

The clutch should be used purely for starting the car from rest and when changing gear. It is bad driving and detrimental to any clutch to "coast" hills with the clutch pedal depressed, or to make a habit of slipping the clutch when rounding corners, etc.

The clutch pedal adjustment is correct when there is $\frac{3}{4}$ in. (20 mm.) free movement measured at the pedal pad and the linkage should be re-set when the movement falls below this figure. Adjustment is provided by a nut on the end of the rod connecting the pedal to the clutch operating lever on the bell-housing; this nut is machined so that it locks itself at every half-

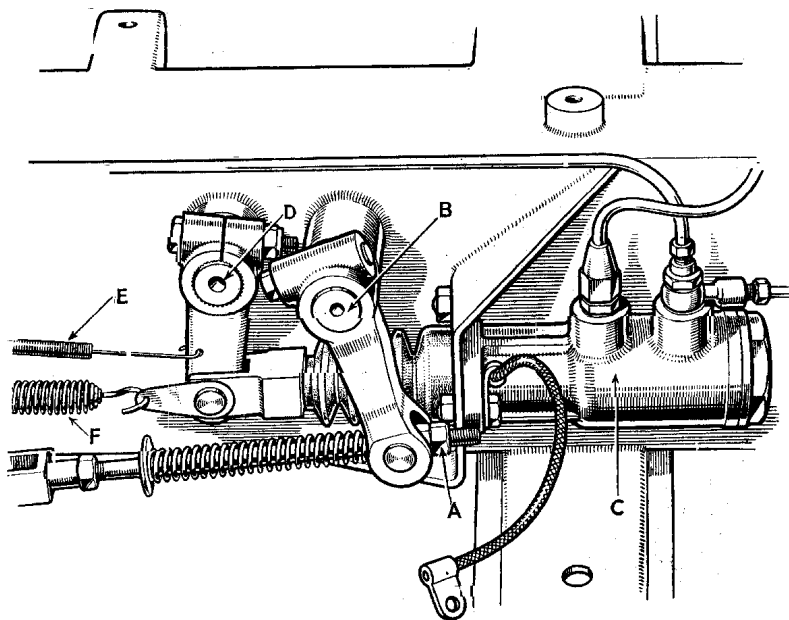


Fig. 14. Clutch adjustment

A – Clutch adjustment nut
B – Clutch pedal shaft
C – Brake master cylinder

D – Brake pedal shaft
E – Stop-light actuating spring
F – Brake pull-off spring

turn against the joint-pin in the pedal lever. To increase the free pedal travel, turn the nut in an anti-clockwise direction half a turn at a time and make sure that the nut is against the pin, before checking the pedal movement. (Fig. 14).

COOLING SYSTEM The system is designed to give very efficient cooling under all operating conditions, provided that the service attentions listed on Page 43 are carried out at regular intervals.

RADIATOR. The radiator, which is constructed with cooling gills of a special design, is cowled to shroud the four-bladed fan mounted on the water pump spindle. Evaporation and consequent loss of coolant when operating at high temperature is prevented by pressurisation of the system by means of a sealed type filler cap. The cap incorporates a relief valve which opens and allows steam to escape at a predetermined pressure; by this means the boiling-point of the coolant is raised appreciably above the normal 100°C. (212°F.). It is most unlikely that such a high temperature would be reached under the most exacting conditions and even if it were, the relief valve permits the engine to be kept running without risk of

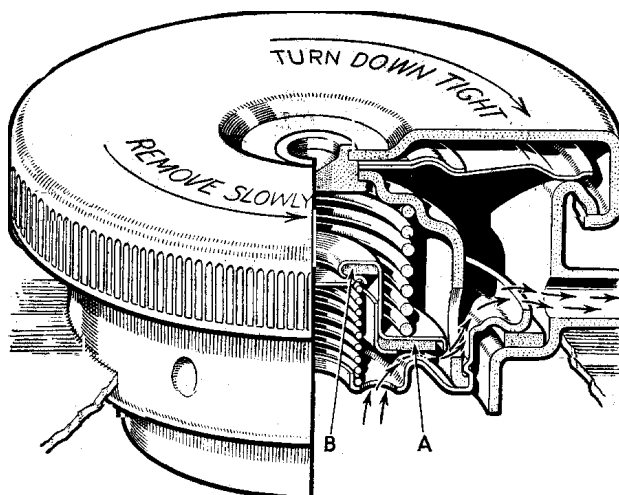


Fig. 15. Radiator filler cap

A – Pressure relief valve (steam escape → → →)

B – Depression relief valve

damage. A vacuum valve is also fitted to the filler cap to relieve the depression resulting when the engine has cooled down after running at extremely high temperatures.

The standard radiator cap incorporates a relief valve which opens at approximately 5 lb. per sq. in. (0,35 Kg/cm²). A special cap is available as an item of extra equipment for use when the vehicle is employed under very hot conditions or for prolonged periods of stationary work; the relief valve in this pattern opens at approximately 15 lb. per sq. in. (1,05 Kg/cm²).

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

The radiator block drain tap is situated at the bottom on the right-hand side.

WATER PUMP.

The centrifugal pattern water pump is designed to give maximum service between overhauls and no adjustment is provided or necessary. It is mounted on the front of the cylinder block and, together with the fan, is driven by a pulley and "V" type belt from the crankshaft. (The belt also drives the dynamo). The sealed double-row ball bearing, integral with the pump spindle, is pre-packed with high melting point grease and requires no further lubrication throughout its life.

THERMOSTAT.

The thermostat is fitted in the housing at the front of the cylinder head above the water pump casing, to which it is connected by a tube and rubber

joint ring. Its purpose is to provide rapid warming-up by causing the coolant to circulate only round the engine until a predetermined temperature is reached, when it opens to allow full circulation through the radiator. The unit operates at 167 – 190 F. (75 – 88 C.) and this setting cannot be altered in any way.

If overheating of the engine should occur, check that the thermostat is functioning correctly; to do this, remove the thermostat from its housing and run the engine; if the overheating is eliminated the unit is faulty and must be replaced.

FAN BELT.

As the belt is of the "V" type, the drive is on the sides of the belt and it is not therefore necessary to adjust it tightly and so put an excessive load on the water pump and dynamo bearings. The tension is correct when it is possible to depress the belt by thumb pressure approximately ½ in. to 1 in. (12 mm. to 25 mm.), at a point midway between the fan and crankshaft pulleys. Adjustment of the belt tension is provided by slackening off the two nuts on the dynamo pivot bolts and the set-bolt retaining the adjusting link to the dynamo, moving the dynamo outwards until the setting is correct and re-tightening the nuts and set-bolt.

DRAINING THE COOLING SYSTEM.

The cooling system should be flushed out at least twice each year. It can be completely drained by opening the taps on the radiator block and on the right-hand side of the cylinder block at the rear; remove the radiator filler cap to prevent a vacuum which may impede thorough draining. When the water has ceased to flow, a piece of wire should be inserted in each tap to make sure that a blockage has not been caused by rust or scale from the system. Place a hose in the radiator filler neck and adjust the flow of water to equal that draining from the two taps; start the engine and allow it to run until the whole cooling system has been thoroughly washed out. Switch off the engine, close the taps, refill the radiator with clean water to the bottom of the filler neck and replace the filler cap. When filling, use soft water for preference (rain water will do), as this prevents to a great extent furring up of the inside of the radiator, cylinder jackets and pipes. The capacity of the system is 17 pints (9,5 litres)

CLEANING RADIATOR.

In the event of the cooling gills of the radiator becoming blocked with dirt, straw, etc., they should be cleaned by means of compressed air or water pressure applied from the rear, so forcing the foreign matter out through the front of the radiator. Never use a metal implement for this purpose or serious damage may result to the radiator core.

SERVICE ATTENTION.

It is a good plan to always inspect the cooling system at the same time as the engine oil level is checked, i.e., daily under normal conditions. This care would largely prevent the possibility of a sudden and costly delay due to coolant loss and consequent engine failure. The inspection need only take a few moments and should include the following points:-

- (i) Water level in radiator – should be to the bottom of the filler neck.
- (ii) Condition of all water hoses – freedom from cracks and hose clips tight.
- (iii) Fan belt tension – a loose belt will lower the efficiency of the pump and fan and cause overheating.
- (iv) Check for water leaks.

FROST PRECAUTIONS.

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

As a thermostat is fitted to the Land-Rover, it must be appreciated that it is possible for the radiator block to freeze when running in cold weather, even though the engine temperature is quite high; for this reason the use of an anti-freezing mixture is absolutely essential. As some anti-freezing solutions have a corrosive effect upon the thermostat and other portions of the cooling system, we have found it necessary to recommend only pure ethylene glycol or good glycol-base solutions such as "Bluecol"; for your own protection we advise you, wherever possible, to use nothing else.

Anti-freezing solutions are far more "searching" at joints than water; before using them in your Land-Rover, it is therefore important to ensure that the cooling system is leak-proof. If any doubt exists regarding the condition of hoses, etc., they should be replaced. The table below gives the percentage volume of Bluecol required to safeguard against temperatures down to -40°F. (-40°C.).

Temperature Range	Coolant Strength	Quantity
Above 32 °F (0 °C)	100% water	17 pints (9,5 litres)
To 12 °F (-11 °C)	86% water	14.5 pints (8,0 litres)
	14% Bluecol	2.5 pints (1,5 litres)
To -4 °F (-20 °C)	80% water	13.5 pints (7,5 litres)
	20% Bluecol	3.5 pints (2,0 litres)
To -20 °F (-29 °C)	76% water	13.0 pints (7,0 litres)
	24% Bluecol	4.0 pints (2,5 litres)
	70% water	11.75 pints (6,5 litres)
	30% Bluecol	5.25 pints (3,0 litres)

The anti-freezing mixture should be well mixed to the required strength in a separate container and added after thoroughly flushing out the system (do not simply add the correct amount of glycol through the radiator filler); run the engine for a short while to assist good circulation.

It is important when the winter is over, that steps be taken not only to drain off the mixture, but to flush the system through several times with very hot soda water in order to remove all traces. Failure to take this precaution may eventually, after a season or two of neglect, lead to the complaint of boiling.

If the vehicle is to be stored, in cold weather, unless it is kept in a well-heated garage or anti-freezing solution has been added to the coolant, the system must be completely drained as instructed under "DRAINING THE COOLING SYSTEM" above. After the water has drained out, it is well to run the engine at a fast idling speed for not more than half a minute, so as to dry out any water that may have been retained in the bottom of the jacketing.

THE FUEL SYSTEM

The fuel system comprises the tank, pipe lines, sediment bowl, pump, carburettor and air cleaner. It is most important that the system be kept clean and free from water; periodically inspect for leaks.

Should the vehicle be stored for an extended period, it is well to completely drain the system to prevent the formation of gum which may cause trouble in the pump and carburettor. To effect complete draining, remove the drain plug in the bottom of, the tank and replace when the tank is empty (Fig. 5); then run the engine until the petrol in the pipes and carburettor is used up.

FUEL TANK.

Petrol is carried in a tank below the front seat-box on the right-hand side. It rests in a stout steel cradle which forms a double bottom and protects the tank proper from damage by stones thrown up from the wheels or contact with any obstacle. The cradle is carried up both in front of and behind the tank, lipped over and bolted to the brackets on the chassis frame, thus relieving the tank of any strain due to possible slight distortion of the chassis frame under extreme conditions of use.

The filler is readily accessible by lifting the lid in the top of the seat-box on the right-hand side (Fig 4). Except on a few early vehicles, a strap is provided on the back-rest panel to hold the lid in the open position. Turn the cap in an anti-clockwise direction to lift it off, which action will reveal a filler tube which can be drawn out and locked by a slight movement to the left, to facilitate filling. Care should be taken to prevent the entry of water or foreign matter. The capacity of the tank is 10 Imperial gallons (45 litres). The filler tube may be completely withdrawn to clean the gauze filter in its lower end; a drain plug is provided in the bottom of the tank. The petrol level unit is mounted in the top of the tank and requires no attention.



"Care should be taken to prevent the entry of water."

Immediately in front of the filler is the petrol feed pipe extending downwards to the bottom of the tank, the lower end is shrouded with fine mesh wire gauze to form a second filter, which being surrounded by petrol is most unlikely to become choked.

SEDIMENT BOWL. Inserted in the feed pipe from the tank to the pump is a sediment bowl mounted on the right-hand side of the scuttle. Any foreign matter in the fuel settles in the glass bowl which can be removed for cleaning in petrol by slackening the thumbscrew below the bowl and swinging aside the wire holder. A fine gauze will be found in the body of the unit; this should also be removed and washed in petrol. When re-assembling, take care to replace the gauze correctly over the square inlet nozzle, and also ensure that the cork sealing washer for the bowl is in good condition.

The sediment bowl should be inspected and cleaned if necessary at the same intervals as the petrol pump filter, i.e., at every 6,000 miles (10,000 Km.).

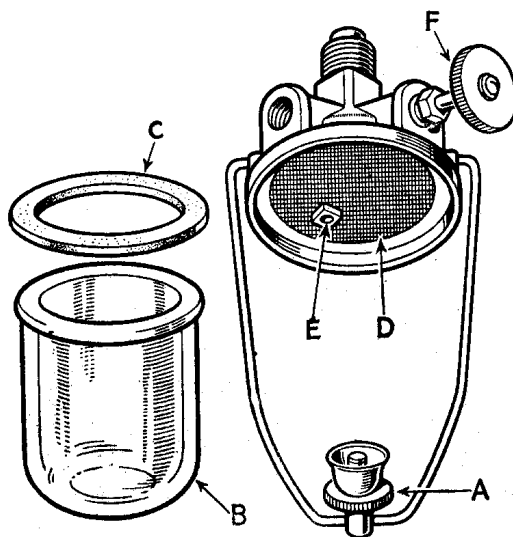


Fig. 16. Sediment bowl

A – Thumbscrew
B – Glass bowl
C – Joint washer

D – Filter gauze (fuel outlet)
E – Fuel inlet
F – Shut-off tap

A screw-down petrol supply shut-off tap is incorporated in the top of the sediment bowl and this will normally be left in the "ON" position; it is not necessary to close the tap when parking the vehicle, but this action would serve as a precaution against theft.

FUEL PUMP. The S.U. electric fuel pump is mounted on the scuttle; it is wired through the ignition and hence will only operate when the ignition switch is "ON." Easy starting of the engine is assured, as the pump fills the carburettor float chamber immediately the ignition is switched on.

The pump is of the diaphragm type and will give prolonged service with the minimum of attention.

A gauze filter (A) is incorporated which can be easily withdrawn by unscrewing the hexagon brass plug (B) in the bottom of the pump body. The only maintenance normally required is the cleaning of this filter at every 6,000 miles (10,000 Km.) clean thoroughly in petrol using a stiff brush, **never use rag.**

Should fuel pump trouble be suspected, first disconnect the union at the pump end of the pipe from the pump to the carburettor and switch on the ignition. Satisfactory performance of the pump will then indicate that the fuel shortage is due either to blockage of the flexible pipe to the carburettor,

or more possibly to the carburettor float needle sticking up. If the pump will not function proceed as follows:-

- (i) Check that the pump filter is clear.
- (ii) Detach the sediment bowl and clean if necessary.
- (iii) Check that the pipe from the pump to the sediment bowl is clear by blowing down it with a tyre pump from the fuel pump end.
- (iv) Check that the pipe from the sediment bowl to the tank is clear by blowing from the bowl end.
- (v) Reconnect the pipes and replace the sediment bowl.
- (vi) Test the system for correct functioning.

Should the pump still not work satisfactorily, it may be due to a poor electrical connection or dirty contact points, which should be checked as follows:-

- (i) Disconnect the feed wire from the terminal (D) on the bakelite cover and strike it against the scuttle; the appearance of sparks will indicate that the current supply is in order.
- (ii) Remove the bakelite cover and touch the terminal with the lead. If the pump does not operate when the points are in contact and a spark cannot be struck off the terminal, it is probable that there is some dirt on the points (F). These may be cleaned by inserting a piece of card between them, pinching them together and sliding the card backwards and forwards.

Failure to rectify the trouble with this treatment will indicate that the pump itself is at fault, due to there being too much tension on the diaphragm. To release this tension, remove the body from the base of the pump by undoing the small screws which hold these two parts together. (The pump earth wire will be released from one of these screws). The diaphragm (G) will be adhered to the body of the pump and must be separated with the aid of a knife; care should be taken to prevent the diaphragm support rollers (H) from falling out during this operation. Replace the body on the pump base and assemble the screws loosely; before finally tightening it is advisable to stretch the diaphragm to its highest possible position by switching on the pump and holding the contact points together whilst tightening the screws.

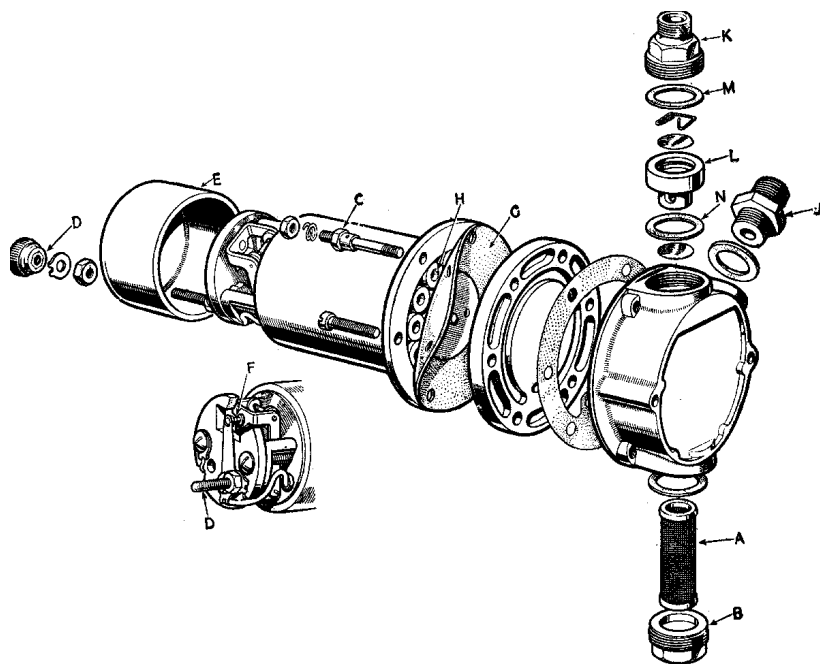


Fig. 17. Fuel pump.

A – Gauze filter	H – Diaphragm rollers
B – Filter plug	J – Inlet union
C – Earthing terminal	K – Outlet union
D – Feed terminal	L – Valve cage
E – Bakelite cover	M – Thick orange washer
F – Contact points	N – Thin red washer
G – Diaphragm	

If at any time the pump becomes noisy in operation an air leak on the suction side is indicated. The simplest way to check this point is to disconnect the flexible pipe from the carburettor and allow the pump to deliver into a can. If the end of the pipe is then submerged in the petrol and bubbles appear, it indicates an air leak which must be found and cured. If the pump keeps on beating without delivering any petrol, it is possible that a piece of dirt is lodged under one of the valves. To locate and remove such an obstruction, unscrew the top union (K) and lift out the valve cage (L). When replacing it see that the thin hard red fibre washer (N) is below the valve cage and the thick orange-coloured one (M) above. A choked filter or an obstruction on the suction side will make the pump get very hot and eventually cause a failure.

The operations outlined above should effectively remedy any trouble likely to occur; if difficulty is still experienced, your local agent should be consulted.

AIR CLEANER.

A small centrifugal pre-cleaner separates the coarser particles of foreign matter before the air passes into the top of the main cleaner body. The air is diverted down a large diameter tube in the centre of the cleaner, at the bottom of which a sharp reversal of direction takes place, thus depositing the majority of the dust into the oil reservoir in the detachable tray forming the bottom of the cleaner. It then passes up through the woven steel packing which fills the annular chamber surrounding the central tube, where the remaining particles are extracted and the clean air travels through the outlet elbow to the carburettor intake. (Fig. 18).

The complete cleaner may be removed from the vehicle by undoing the three large clips securing it to the support on the battery box. It is also necessary to disconnect the outlet elbow from the carburettor duct, by rotating a cam ring on the duct to release two clips.

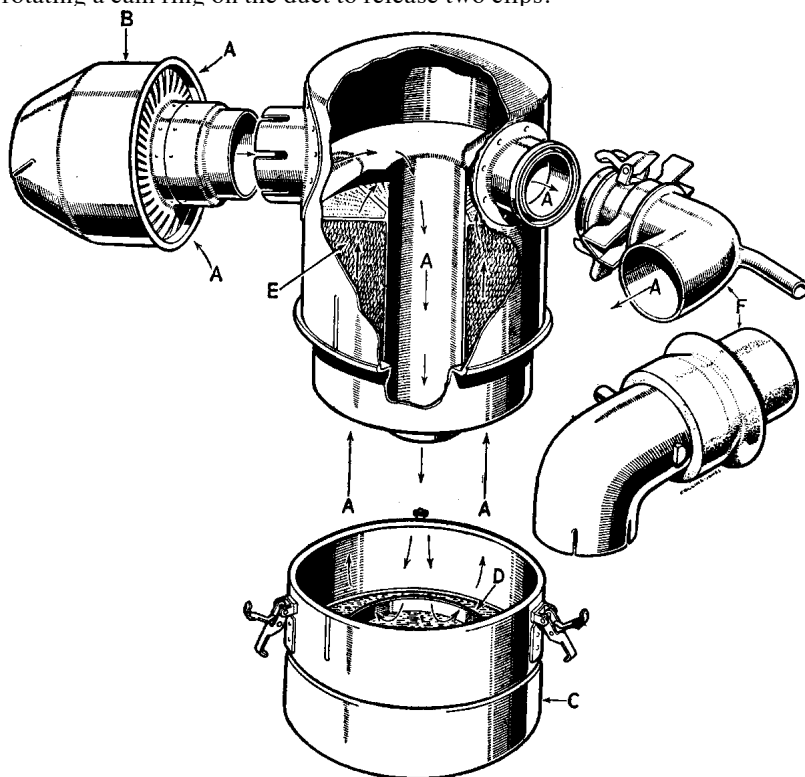


Fig. 18. Air cleaner

A – Path of air shown → → →
B – Centrifugal pre-cleaner
C – Oil bath

D – Oil level
E – Woven steel packing
F – Outlet to carburettor

The oil bowl forming the bottom of the cleaner is secured to the body by means of three further (small) clips; when replacing the bowl, align the white marks on the cleaner body and bowl to ensure correct location of the clips. The correct oil level in the bowl is indicated by a ring formed in the pressing; the capacity is approximately 2 pints (1 litre).

Two engine breather pipes from the crankcase and top rocker cover are led into the carburettor duct.

Attention to the air cleaner is extremely important, especially under dusty conditions, as it plays a very important part in preventing engine wear generally and cylinder bore wear in particular. If the vehicle is used mainly for road work, the oil bowl should be emptied, cleaned and refilled to the level mark with engine oil at each engine oil change; at the same time clean the filter gauze by swilling the cleaner body in petrol. When the vehicle is used for field work, clean and change the oil in the cleaner much more frequently, under extremely dusty conditions, such as harrowing or scuffling, daily oil changes may be required.

CARBURETTOR.

The Solex carburettor, type 32 PB12, is fitted with a bi-starter and a two-phase acceleration and economy device, the operation of the bi-starter being fully described in the "STARTING PROCEDURE" section.. No adjustment is normally required to the carburettor and the only manual setting provided is that to obtain smooth engine idling.

Slow-running adjustment.

Prior to making this adjustment it is important to ensure that the engine is in good mechanical condition; the compressions should be equal, the ignition system in order and the inlet manifold free from air leaks. The throttle "pull-off" spring must pull the throttle right back to its stop, i.e., closed position; also make sure that the volume control screw (W) has not been broken or distorted by over-tightening, in which case a replacement must be obtained. (Fig. 19).

Then proceed with the adjustment as follows:-

1. Run the engine until it is hot – never set the idling with a cold engine.
2. Set the slow-running screw (A) until the idling is on the high side.
3. Slacken the volume screw (W) until the engine begins to hunt.

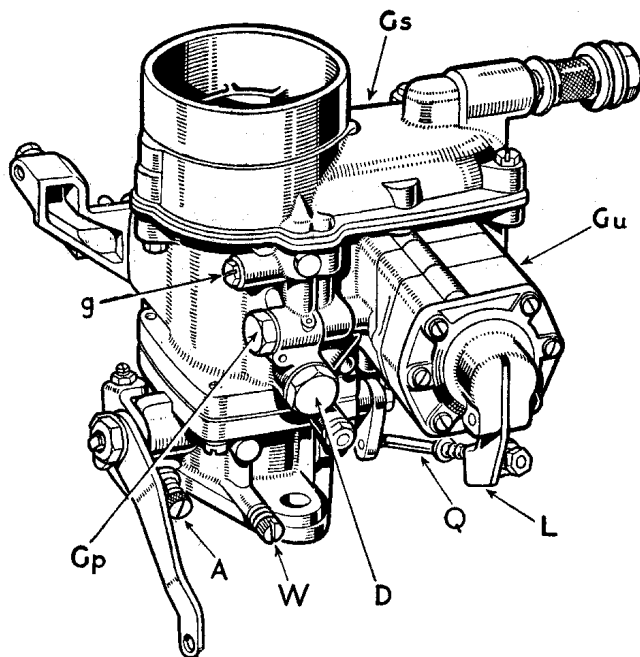


Fig. 19. Carburettor

A – Slow-running screw
 D – Main jet
 G – Pilot jet
 Gp – Pump jet
 Gu – Economy jet

Gs – Starter jet
 L – Accelerator pump operating lever
 Q – Accelerator pump operating rod
 W – Volume screw

4. Screw it in very gradually until the hunting just disappears.
5. If the engine speed is too high, reset the slow-running screw to slow it down to an idling speed of about 500 R.P.M.
6. This may cause a resumption of slight hunting. If so, turn the volume control screw gently in a clockwise direction until the idling is perfect.

Carburettor jet cleaning.

Reference is made in the "IN CASE OF TROUBLE" section on Pages 77 and 83 to carburettor jet cleaning.

It is most unlikely that trouble will be experienced with blocked jets, but Fig. 19 will help you to locate and remove the jets which may need cleaning. These are:-

- (i) Main petrol jet, the jet proper is screwed in to the inner end of the carrier (D), which must be removed to gain access to the jet.

- (ii) Pilot jet (g) has a screwdriver slot in the hexagon head.
- (iii) Accelerator pump jet (Gp) is located between the main and pilot jets.
- (iv) Economy jet (Gu) is located at the side of the accelerator pump housing, opposite the pump jet.
- (v) Starter petrol jet (Gs) is a plain hexagon-headed unit at the rear of the carburettor.

STEERING

The Burman steering gear fitted to this vehicle is of the worm and nut type, the inner column having a multi-start thread on which operates a cylindrical nut made of a special bronze alloy. The nut is free to move longitudinally in the main steering box housing, while in the side of the nut is a hardened steel bush in which operates a ball-headed extension of the rocker shaft. This latter is set at right-angles to the nut and carries the drop arm at the other end.

All end thrusts are taken by a three-piece fully adjustable ball bearing situated at the top of the steering column immediately under the steering wheel.

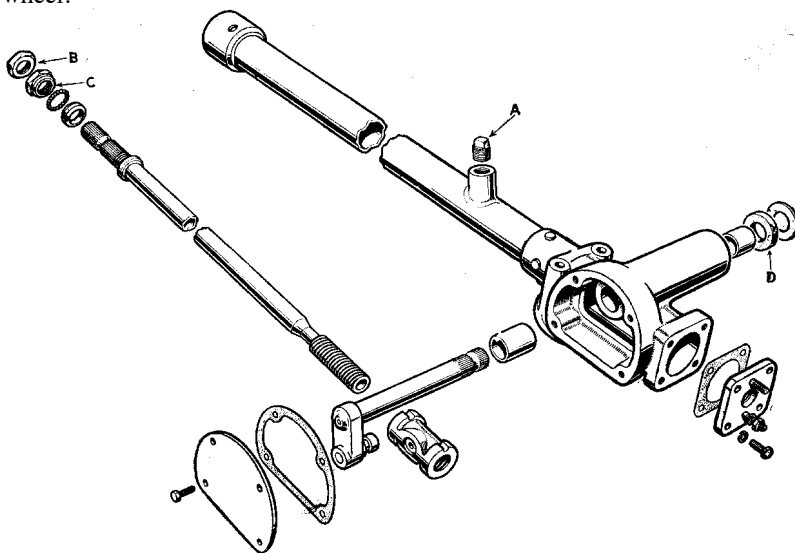


Fig. 20. Steering gear

A – Oil filler plug
B – Lock nut

C – Adjusting nut
D – Felt washer

STEERING COLUMN ADJUSTMENT.

The only adjustment provided is to the top journal bearing. This consists of a cup secured by a lock-ring in the top of the outer column and two races, the lower one being fitted to the inner column before assembly, after which the balls are put in place and the top race adjusted by a hexagon nut and lock-nut.

Wear or end play on the inner column can therefore be taken up by first partially drawing away the steering wheel to allow access to the lock-nuts; then unscrew the top nut, pull down the lower nut until end play disappears and finally screw down the lock-nut absolutely tight.

The adjustment just described should rarely need attention and no other part of the gear calls for adjustment. Should the occasion arise to remove the drop arm, care should be taken not to damage the felt washer; if it becomes damaged a replacement should be obtained.

BRAKING SYSTEM DESCRIPTION.

The wheel brakes, operated by the foot pedal, are of the Girling hydraulic type, while the hand-brake operates a Girling mechanical brake unit mounted on the output shaft from the transfer box.

WHEEL BRAKE ADJUSTMENT. 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:-

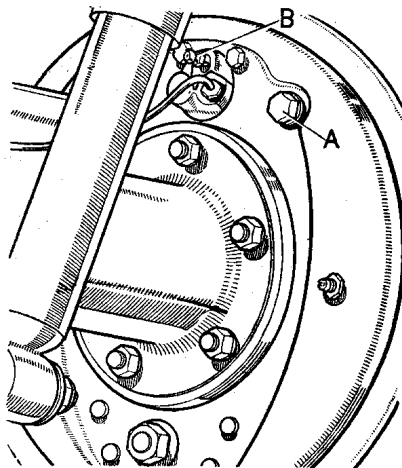


Fig. 21. Wheel brake adjustment

A – Brake adjuster

B – Bleed nipple

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

NOTE. – No adjustment is required or provided on the type of wheel brakes fitted to early vehicles, the design being such that the brake shoes are always in the correct position relative to the drum. It is well to check which type of brake is fitted to any particular vehicle.

TRANSMISSION BRAKE ADJUSTMENT. Periodic adjustment of the transmission brake unit will be required; proceed as follows (see Fig. 22):- Release the hand-brake. Adjustment is made by means of the adjuster wedge spindle, protruding from the front of the brake back-plate; during rotation of the adjuster a click will be felt and heard at each quarter revolution. Rotate the spindle as far as possible in a clockwise direction, i.e., until the brake shoes contact the drum. Then unscrew the adjuster two clicks, and give the brake a firm application to centralise the shoes; the brake drum should now be quite free to rotate. No other adjustment to the handbrake system is necessary to compensate for lining wear.

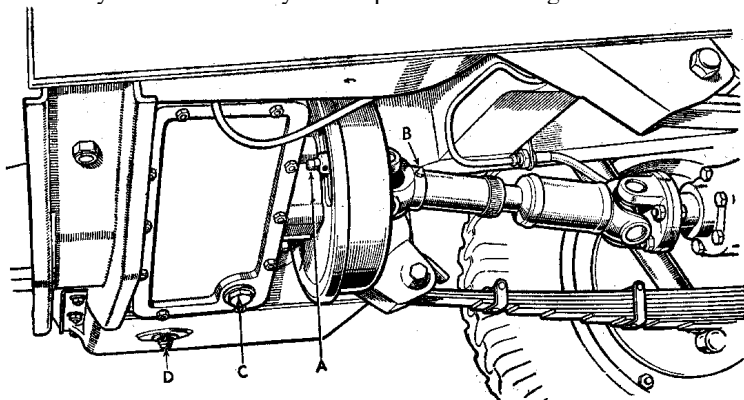


Fig. 22. Transmission brake adjustment

A – Transmission brake adjuster

B – Propellor shaft sleeve lubrication nipple

C – Transfer box oil drain plug

D – Petrol tank drain plug

HYDRAULIC RESERVOIR.

The fluid reservoir for the hydraulic wheel brake system is fitted under the seat box on the right-hand side and is accessible when the locker lid is raised. (The reservoir was fitted on the front of the dash panel on a few

early vehicles). The fluid level should be inspected weekly and topped-up as necessary until the reservoir is three-quarters full. Use only genuine Girling Crimson Brake Fluid, which can be obtained from any Rover Dealer or Girling Agent.

BLEEDING THE BRAKE SYSTEM.

If the level of the fluid in the reservoir is allowed to fall too low, or if any section of the brake pipe-line is disconnected, the brakes will feel "spongy" due to air having been absorbed into the system. It will be necessary to remove this air-lock by "bleeding" the brake system at the wheel cylinders. Bleeding must always be carried out at all four wheels, irrespective of which portion of the pipeline is affected. Proceed as follows:-

Attach a suitable length of rubber tubing to the bleed nipple on the brake back-plate (Figs. 8, 9 and 10) and place the lower end of the tube in a glass jar. Slacken the bleed screw behind the nipple and pump the brake pedal slowly up and down, pausing at each end of each stroke, until the fluid issuing from the tube shows no sign of air bubbles when the tube is held below the surface of the fluid in the jar. Then tighten the bleed screw before removing the tube from the fluid in the jar.

Repeat these operations for the three other wheels in turn. It is well to continually replenish the fluid in the reservoir while pumping, to ensure that the level does not fall too low and cause another air-lock to be formed.

SUSPENSION

The semi-elliptic leaf springs and the spring shackles are fitted with rubber bushes, which need no lubrication attention; the front road springs are interchangeable while the rear ones are handed. As a safeguard in the event of main spring leaf fracture, the ends of the second leaf are curled over the bushes, to afford some measure of support until the defect can be rectified. Spring control is by Woodhead-Monroe hydraulic dampers, mounted on rubber bushes at top and bottom. This pattern damper is a double-acting control unit which ensures a smooth damping of the spring oscillations on both bump and rebound. By means of a special seal in the damper, the hydraulic fluid is kept in circulation in such a manner that leakage is not possible and therefore no topping-up is required at any time.

Should the dampers require attention as a result of accidental damage, they cannot be repaired by garages or service stations and should therefore be returned to your Rover agent, who will be able to supply replacement units.

WHEELS AND TYRES

Your Land-Rover is equipped with Dunlop tyres.

Dunlop 6.00-16 Trakgrip T28 pattern tyres are fitted as standard equipment and are ideal for general cross-country work, towing, etc.; they are also serviceable on road or track.

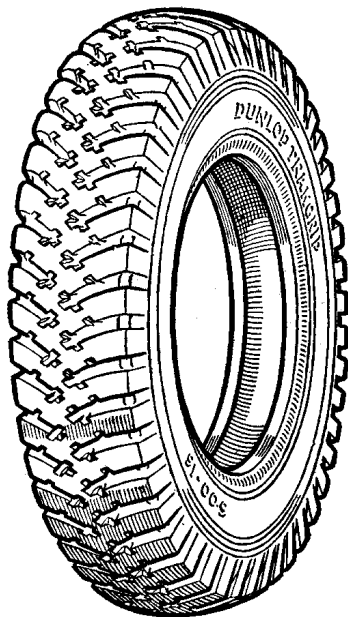


Fig. 23. Dunlop 6.00 - 16 Trakgrip T28 Tyre

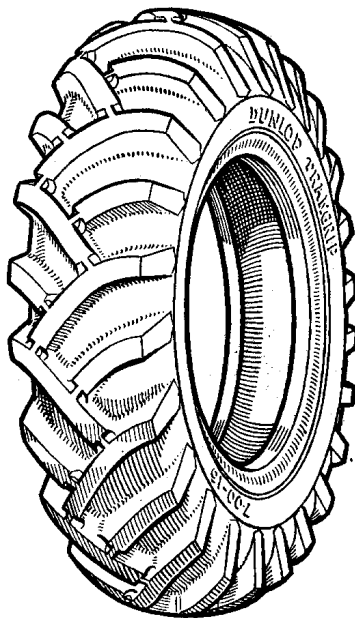


Fig. 24. Dunlop 7.00 - 16 Trakgrip T25 Tyre

As alternative equipment, Dunlop 7.00-16 Trakgrip T25 pattern tyres are available, to obtain maximum wheel grip and driving power when operating over soft mud, ploughland and all unprepared surfaces. Although this "tractor" type tyre can be used for short distances on the road, it is essentially an "off the road" tyre and is not recommended for road work. The tread form makes both types of tyre "unidirectional." They must be fitted with the "V" or "arrow" in the tread pattern pointing forwards at the top of the wheel to ensure maximum grip and efficient tread cleaning when operating on soft ground.

Two types of road wheel are available for the Land-Rover, a well-base type or a divided type; the divided wheel may readily be identified by the ring of bolts securing the two halves together. Either pattern wheel may be used with 6.00-16 or 7.00-16 tyres. Rubber protection flaps must be fitted when divided wheels are used.

TYRE PRESSURES.

If maximum tyre life and performance are to be obtained then careful attention must be given to the question of correct tyre pressures. For NORMAL ROAD AND CROSS-COUNTRY work, tyre pressures must be maintained at:-

Front.	Rear.
20 lb. per sq. in. 1,4 Kg. /cm ² .	26 lb. per sq. in. 118 Kg. /cm ²

When LOADS IN EXCESS OF 550LB. (250KG.) are carried in the rear of the vehicle, pressures in the REAR TYRES ONLY must be raised to 30 lb. per sq. in. (2,1 Kg. /cm²).

Should it be desired to traverse EXCEPTIONALLY SOFT GROUND, the tyre pressures may be REDUCED to

Front.
6.00-16: 15 lb. per sq. in. (1,05 Kg. /cm ²).
7.00-16: 13 lb. per sq. in. (0,9 Kg. /cm ²).
Rear.
6.00-16: 20 lb. per sq. in. (1,4 Kg. /cm ²).
7.00-16: 18 lb. per sq. in. (1,25 Kg. /cm ²).

These reduced pressures must only be employed when absolutely essential and the pressures MUST BE RETURNED TO NORMAL immediately after the soft ground has been negotiated.

Pressures should be checked weekly, using the pressure gauge included in the tool kit; at the same time it is advisable to check the wheel nuts for tightness. In order to obtain accurate pressure readings, the check should be made when the tyres are cold, with the gauge held horizontally. Any unusual pressure loss should be investigated; after making sure that the valve is not at fault, the inner tube should be removed and subjected to a water test.

FITTING THE SPARE WHEEL. Owing to the unidirectional treads of the tyres, it may be necessary to reverse the spare tyre on its wheel (depending on which side of the vehicle it is to be fitted) to ensure efficient tread cleaning.

CHANGING TYRE POSITIONS. In the interests of tyre mileage and even wear, it is desirable to change the position of the tyres on the vehicle (including the spare) at intervals of 3,000 miles (5.000 Km.). The front and rear wheels should be interchanged on each side of the vehicle; at the same

time, the spare wheel should be fitted to give it a spell of duty and one of the other wheels removed to become the spare.

TYRE EXAMINATION. Examine the tyres frequently for flints, nails, etc., which may be embedded in the tread and also for cuts, penetrations and oil. Flints and sharp objects should be removed with a penknife or similar tool; if neglected, the foreign body may work through the cover and puncture the tube.

Oil and grease should not be allowed to get on the tyres. If any should accidentally do so, clean off by using petrol sparingly. Do not use paraffin, which has a very detrimental effect on rubber.

Ensure that valve caps are fitted and screwed down firmly by hand; do not use tools as the rubber seating may become damaged if the cap is screwed down too tightly. The valve cap prevents the entry of dirt to the valve mechanism and forms a positive seal on the valve, so preventing leakage even if the valve core is damaged.

IMPACT TYRE FRACTURES. Excessive and sudden local distortion of the tyre, such as might result from striking a kerb or loose brick, etc., may cause the casing cords to fracture.

Every effort should be made to avoid obstacles, particularly when drawing up to a kerb or parking against one. Extra precaution should be taken when driving after dark.

REPAIRS. Minor injuries confined to the tread rubber, such as from nails, tacks and small pieces of road dressing material require no attention other than the removal of the object. More severe tread cuts or wall rubber damage require vulcanised repairs, so preventing any extension of the injury. The use of gaiters or liners for the repair of casing injuries should be regarded as a temporary emergency measure and not as a satisfactory substitute for vulcanised repairs.

Inner tube injuries up to $\frac{1}{4}$ in. (7 mm.) can be repaired with patches; more extensive damage needs a proper vulcanised repair.

FACTORS AFFECTING TYRE WEAR. The main factors which influence tyre wear are as follows:-

1. **INCORRECT TYRE PRESSURES.**
2. **SPEED.** The rate of tyre wear is increased rapidly if high average speeds are maintained habitually.
3. **ACCELERATION.** During wheel slippage, caused by rapid acceleration, excessive tread wear takes place through abrasion of the tyre against the road surface.
4. **HARSH BRAKING.**

5. **CLIMATIC CONDITIONS.** In the British Isles, the rate of tread wear on the warm, dry roads in summer can be twice as fast as on the cold, wet surfaces common in winter. In certain overseas territories the difference may be even more marked.
6. **ROAD SURFACE.** Road surfaces vary enormously in their effect upon tyre wear.
7. **WHEEL ALIGNMENT.** It is most important that correct front wheel alignment be maintained, otherwise the tyre treads will be worn off laterally. The wheel alignment should be checked periodically by your dealer and adjusted if necessary.

TYRE REMOVAL AND FITTING.

WELL-BASE WHEELS.

NOTE.-Inextensible wires are incorporated in the tyre beads and no attempt must be made to stretch the beads over the rim flanges; excessive force is unnecessary as it merely tends to damage the beads.

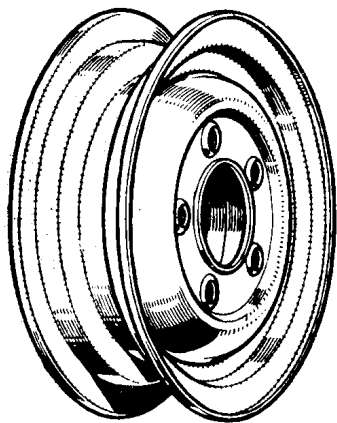
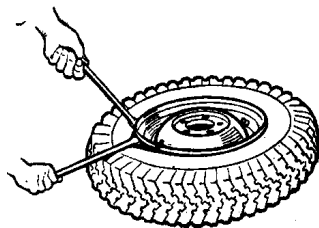


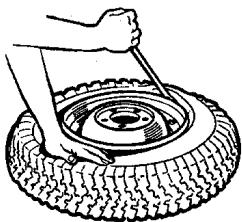
Fig. 25. Well-base rim wheel

The operation will be more easily carried out if the cover beads are lubricated liberally with water, preferably with a little soap added. Tyre levers should be dipped before each insertion.

REMOVAL.

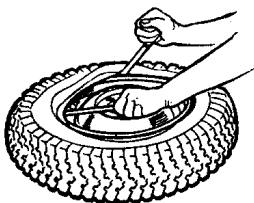
1. Remove the valve cap and core and place them clear of dirt and grit.
2. Press each bead in turn off its bead seat, using tyre levers, and working round the tyre in small steps. Two or three circuits of the tyre may be necessary to free the beads completely.



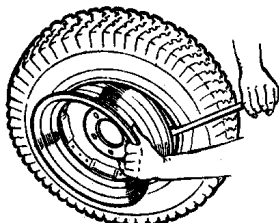


3. Insert a lever at the valve position, and while pulling on this lever, press the head into the well of the rim diametrically opposite the valve position.

Insert a second lever close to the first and prise the bead over the rim flange, holding the removed portion of the bead with the first lever.



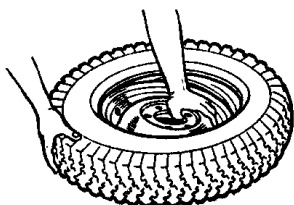
4. Remove one lever and re-insert a little further away from the first lever. Continue round the bead, proceeding in small steps, until the bead is completely removed. Remove the inner tube.



5. Stand the wheel upright and insert a lever between the remaining bead and the rim flange; pull the cover back over the flange. If it is difficult to remove, maintain the pressure on the lever and tap the bead with a rubber mallet where it passes over the top of the flange.

FITTING

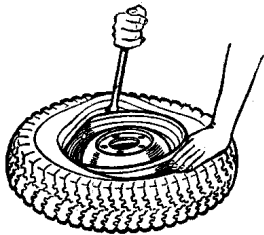
1. Thoroughly examine the cover for nails, flints, etc., and ensure that no loose objects have been left inside. Clean the wheel rim flanges and seatings. Always use the correct size of inner tube, which should bear the same description as the outer cover.



2. Place the cover eccentrically over the rim, positioned so that when the cover and tube are fitted, the white spots near the cover bead will coincide with the black spots on the tube; press the lower bead by hand as much as possible into the well of the rim.



3. Insert a lever as closely as possible to the point where the bead passes over the flange and lever the bead over the flange. Repeat until the bead is completely over the flange.



4. Inflate the inner tube until it is just rounded out, dust with French chalk and insert it in the cover with the valve through the hole in the rim, taking care that the valve is on the correct side of the rim.

5. Press the bead into the rim well diametrically opposite the Valve and insert a lever as closely as possible to the point where the bead passes over the flange; lever the bead over the flange. Repeat until the bead is in position all round, finishing at the valve position.

6. Push the valve inwards to make sure that the tube adjacent to the valve is not trapped under the bead. Pull the valve firmly back into position and see it protrudes squarely from the rim during inflation. If not, deflate the tyre and adjust the positions of the cover and tube on the rim.

7. Inflate the tyre and ensure that the beads are seated properly by checking the concentricity of the fitting line on the cover with the top of the flange.

8. Remove the valve core to deflate the tube completely, replace and re-inflate to the recommended working pressure. The object of double inflation is to relieve any strain in the tube.

DIVIDED WHEELS.

NOTE.-Under no circumstances must the clamping nuts, which hold the two halves of the wheel together, be slackened unless the tyre is fully deflated. Failure to observe this rule may result in damage to the equipment and involve the risk of personal injury.

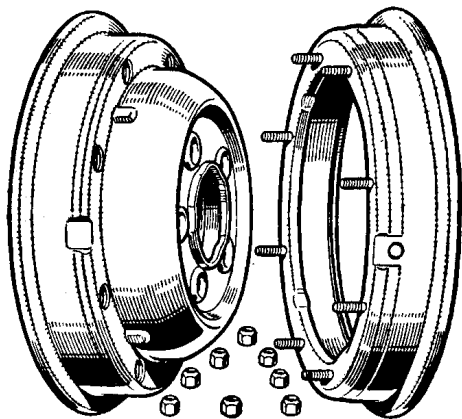
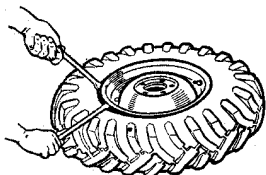


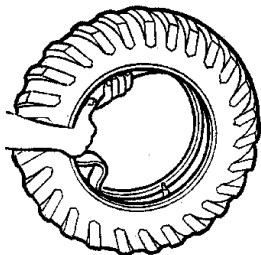
Fig. 26. Divided wheel

REMOVAL

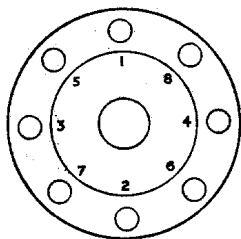


1. Remove the valve cap and core to deflate the tyre and place them clear of dirt or grit.
2. Press each bead in turn away from the flange, using levers and working round the tyre in small steps. Two or three circuits of the tyre may be necessary to free the beads completely.
3. Slacken and remove the clamping nuts. Remove the upper half of the wheel. Push the valve through the lower half of the wheel and remove the cover and tube.

FITTING



1. Thoroughly examine the cover for nails, flints, etc., and ensure that no loose objects have been left inside. Clean the wheel rim flanges and seatings. Always use the correct size of inner tube, which should bear the same description as the outer cover.
2. Inflate the inner tube until it is just rounded out, dust with French chalk and insert it in the cover with the white spots near the cover bead coinciding with the black spots on the tube.
3. Fit the protection flap, starting at the valve position. Make sure that the edges of the flap are not turned over inside the cover and that it lies centrally between the beads. See that the flap fits closely against the tube round the valve.
4. Lay the studded half of the wheel on the floor or bench with the studs pointing upwards. Fit the cover over the wheel and thread the valve through the hole, making sure that it points downwards.



5. Fit the other half of the wheel and tighten the clamping nuts lightly. Finally tighten the nuts in the sequence illustrated. Check that the valve is free and inflate the tyre to the recommended pressure.

TYRE AND WHEEL BALANCE.

In the interests of smooth riding, precise steering and the avoidance of high speed reaction, Dunlop tyres are balanced to close limits. During assembly of the vehicle, small balance weights are then used to attain an even higher degree of balance on wheel and tyre units.

When refitting a tyre after repair, the white spots on the cover bead should be positioned to coincide with the black spots on the inner tube. Should it be desired to regain the original fine degree of balance, your dealer will be able to balance the wheel and tyre assembly.

If inner tubes without the black balancing spots are used for replacement purposes, it is advantageous to fit the covers so that the white spots are at the valve position.

DUNLOP TYRE SERVICE.

Owners are urged to take full advantage of the facilities offered by the Dunlop tyre service organisation, with its many depots and agencies throughout the world.

When replacement tyres are required, orders should specify Dunlop 6.00 – 16 Trakgrip T28 or Dunlop 7.00 – 16 Trakgrip T25 pattern.

ELECTRICAL EQUIPMENT

BATTERY.

The battery is carried under the bonnet on the right of the engine. The electrolyte level should be checked at intervals of 1,000 miles (1.500 KM.) in the following manner:-

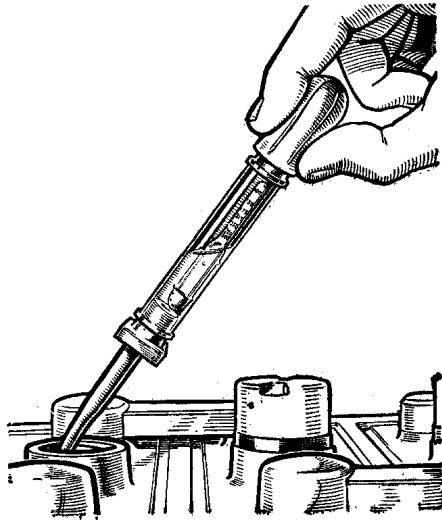


Fig. 27. Topping-up battery, using a hydrometer

Remove the filler plug from each cell of the battery and examine the level of the electrolyte in each cell. If necessary, add sufficient distilled water to bring the electrolyte level with the tops of the separators. A hydrometer will be found useful for topping up as it prevents the distilled water from being spilled on top of the battery. Do not use tap water and do not use a naked light when examining the condition of the cells. Examine the terminals and if they are corroded, scrape them clean and coat with petroleum jelly.

Wipe away all dirt and moisture from the top of the battery and make sure that the connections are clean and tight.

NOTE: -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 be 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.

Occasionally check the condition of the battery by taking hydrometer readings of the specific gravity of the electrolyte in each of the cells. Readings should not be taken immediately after "topping-up" the cells. The specific gravity readings and their indications are as follows:-

1.280-1.300 (32° - 34° Baume) Battery fully charged.

About 1.210 (25° Baume) Battery about half discharged.

Below 1.150 (19° Baume) Battery fully discharged.

These figures are given assuming the temperature of the solution is 60°F. (15.5°C.). If the electrolyte temperature exceeds this, 0.002 must be added to hydrometer readings for each 5°F. (3°C.) rise to give the true specific gravity at 60°F. (15.5°C.). Similarly 0.002 must be subtracted from hydrometer readings for every 5°F. (3°C.) below 60°F. (15.5°C.).

The readings for all cells should be approximately the same. If one cell gives a reading very different from the rest, it may be that acid has been spilled or has leaked from this particular cell or there may be a short circuit between the plates. In this case the battery should be examined by a Lucas Service Depot or Agent.

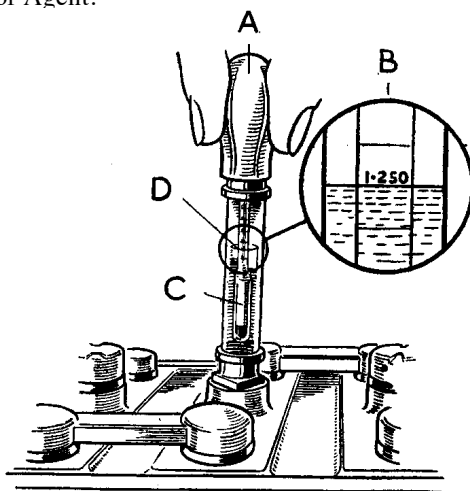


Fig. 28. Taking hydrometer readings

A – Hold tube vertical

C – Float must be free

B – Take readings at eye level

D – Do not draw in too much electrolyte

When taking specific gravity readings, examine the condition of the electrolyte in the hydrometer; it should be fairly clear. If it is very dirty, it is possible that the plates are in a bad condition

and the battery should be sent to a Lucas Service Depot or Agent for overhaul.

NOTE:- If the vehicle is to be left in the open in very cold weather, care must be taken to ensure that the battery is in a good state of charge, otherwise there is danger of the electrolyte freezing and consequent damage to the battery.

DYNAMO. The dynamo is of the compensated voltage type and operates in conjunction with the regulator unit which is housed along with the cut-out in the control box.

The regulator causes the dynamo to give an output which varies according to the load on the battery and its state of charge. When the battery is discharged, the dynamo gives a high output so that the battery receives a quick recharge which brings it back to its normal state in the minimum possible time.

On the other hand, if the battery is fully charged, the dynamo is arranged to give only a trickle charge which is sufficient to keep it in good condition without any possibility of causing damage to the battery by overcharging. The regulator also causes the dynamo to give a controlled boosting charge at the beginning of a run which quickly restores to the battery the energy taken from it when starting. After about 30 minutes running, the output of the dynamo falls to a steady rate, best suited to the particular state of charge of the battery.

At about every 18,000 miles (30,000 Km.) or 500 hours, unscrew the lubricator at the end of the dynamo, lift out the felt pad and spring and about half fill the lubricator with high melting-point grease. Replace the spring and felt pad.

When the vehicle is under-going a general overhaul, say after about 50,000 miles (80,000 Km.), it is advisable to have the dynamo checked for brush or commutator wear by a Lucas Service Depot or Agent.

Occasionally inspect the dynamo driving belt and adjust if necessary to take up any undue slackness by turning the dynamo on its mounting (see "FAN BELT"). Care should be taken to avoid over-tightening the belt and to see that the machine is properly aligned, otherwise undue strain will be thrown on the dynamo bearings

Ammeter Readings.

When noting ammeter readings, it must be remembered that during daytime running when the battery is in good condition, the dynamo gives a trickle charge, so that the charge reading will seldom be more than three or four amperes.

A discharge reading may be given immediately after switching on the headlamps. This usually happens after a long run, when the voltage of the battery is high. After a short time, the battery voltage will fall, and the regulator will respond, causing the dynamo output to balance the load. When starting from cold, the charging current will rise until it reaches a steady maximum at a speed of say, 20 m.p.h. (35 k.p.h.) after which it will remain fairly high for about 10 minutes and then fall to a steady charge which is most suitable for the particular state of charge of the battery. It will be noticed from the ammeter readings that the dynamo does not charge at very low engine speeds. This is because it is not rotating fast enough to generate sufficient energy to charge the battery. The cut-out, which is an automatic switch connected between the dynamo and the battery, allows the flow of current from the dynamo, to the battery only. It closes when the dynamo is running fast enough to charge the battery and opens when the speed is low, or the engine is stationary, thus preventing current flowing from the battery through the dynamo windings.

CONTROL BOX.

This unit is mounted on the scuttle and houses the cut-out and dynamo voltage regulator.

The cut-out and regulator are accurately set before leaving the works and they must not be tampered with. The cover protecting them is sealed.

FUSE.

The single fuse is located, together with a spare, under a separate cover alongside the control box on the scuttle. It protects the horn, windscreen wiper, fuel tank level unit and the stop lights.

A blown fuse is indicated by the failure of all the units protected by it, and is confirmed by examination of the fuse, which can easily be withdrawn from the spring clips in which it fits. If it has blown, the broken ends of the wire will be visible inside the glass tube.

Before replacing, a blown fuse, inspect the wiring of the units, that have failed for evidence of a short circuit or other fault which may have caused the fuse to blow and remedy the cause of the trouble first.

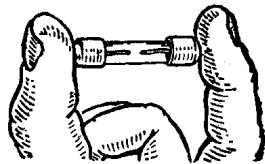


Fig. 29. Blown fuse.

It is important to use replacement fuses of the correct value; the fusing value is marked on a coloured paper slip inside the glass tube of the fuse.

If the new fuse blows immediately and the cause of the trouble cannot be found, have the equipment examined at a Lucas Service Depot.

STARTER.

When starting, observe the following points:-

1. See that the controls are properly set. (See Page 15).
2. Operate the starter switch firmly and release it as soon as the engine fires.
3. Do not operate the starter when the engine is running. If the engine will not fire at once, allow it to come to rest before operating the switch again. (See Page 16).
4. Do not run the battery down by keeping the starter on when the engine will not start.

In the event of the starter pinion becoming jammed in mesh with the flywheel, it can usually, be freed by turning the starter armature by means of a spanner applied to the shaft extension at the commutator end. This is accessible by pulling off the small cap which is secured by two screws. If any difficulty is experienced with the starter not meshing correctly with the flywheel, it is probable that the presence of dirt on the starter drive is preventing the free movement of the pinion on its sleeve and the sleeve and pinion should be washed with paraffin. Alternatively, the drive may have been damaged owing to misuse.

As in the case of the dynamo, the starter brush gear and commutator will not normally require attention by the owner, but should be checked by a Lucas Service Depot or Agent when the car is undergoing a general overhaul.

COIL.

The coil requires no Attention beyond keeping its exterior clean, particularly between the terminals, and occasionally checking that the terminal connections are quite tight.

DISTRIBUTOR.

The contact breaker clearance should be checked and adjusted in the following manner:- Remove the moulded distributor cap and turn over the engine by hand until the contacts in the distributor are fully opened. Check the gap with the gauge on the screwdriver supplied in the tool kit. This gauge has a thickness of .012 in. (0,30 mm.) and if the setting is correct the gauge should be a sliding fit. If the gap varies appreciably from the gauge the contact breaker must be adjusted. To adjust, keep the engine in position to give the maximum opening of the contacts and slacken the two screws which secure the contact plate. Move the plate until the gap is set to the thickness of the gauge and then fully tighten the locking screws.

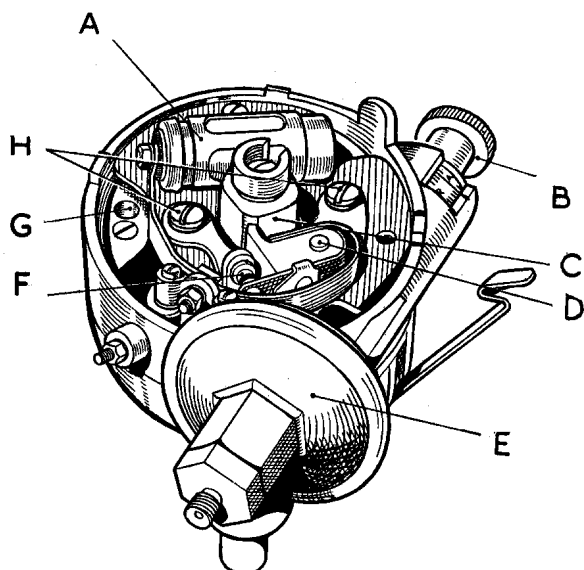


Fig. 30. Contact Breaker

A – Condenser

B – Octane selector

C – Cam

D – Contact breaker pivot

E – Diaphragm housing

F – Contacts

G – Lubricator

H – Screws securing contact plate

The distributor should be thoroughly cleaned at intervals.

Wipe the inside and the outside of the moulded distributor cap with a soft, dry cloth, paying particular attention to the space between the metal electrodes. See that the small carbon brush on the inside of the moulding works freely in its holder.

Examine the contact breaker. The contacts must be free from grease or oil. If they are burned or blackened, clean them

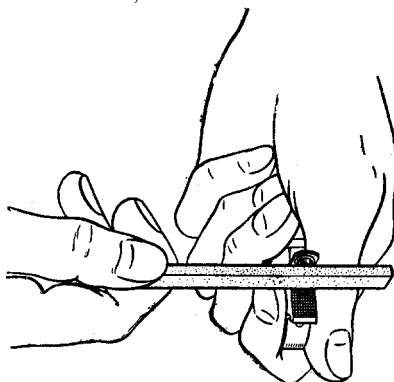


Fig. 31. Cleaning contacts, with moving contact removed

with a fine carborundum stone or with very fine emery cloth. Afterwards wipe away any trace of dirt or metal dust with a petrol-moistened cloth. Cleaning of the contacts is made easier if the contact breaker lever carrying the moving contact is removed. To do this, slacken the nut on the terminal post and lift off the end of the contact breaker spring which is slotted to facilitate removal.. The lever can then be lifted off its pivot pin. After cleaning and replacing, check the contact breaker setting.

If the contacts are badly burned, they should be replaced. Replacement contacts must only be fitted in pairs. To remove the moving contact, follow the procedure outlined in the previous paragraph. To remove the plate carrying the fixed contact take out the two screws complete with spring and plain washers. Fit the replacement contacts by reversing these instructions and set the contact breaker gap to .012 in., (0,30 mm.) by means, of the gauge supplied in the tool kit.

HIGH TENSION CABLES. The high tension cables are those connecting the coil to the distributor and the distributor to the sparking plugs. When these cables show signs of perishing or cracking they must be replaced by 7 mm. rubber-covered ignition cable.

The method of connecting H.T. cable to the coil is to thread the knurled moulded nut over the cable, bare the end of the cable for about 1 in. (7 mm.), thread the wire through the washer removed from the end of the original cable and bend back the wire strands. Screw the nut into its terminal.

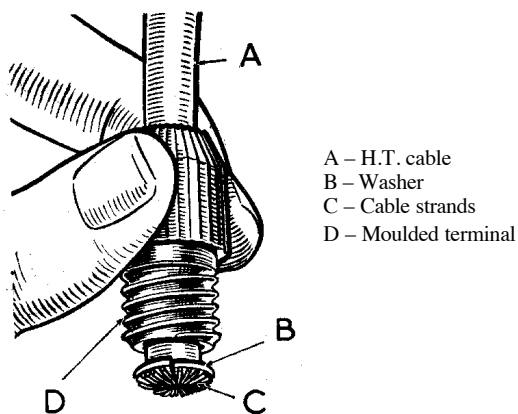


Fig. 32. Fitting H.T. cable to ignition coil.

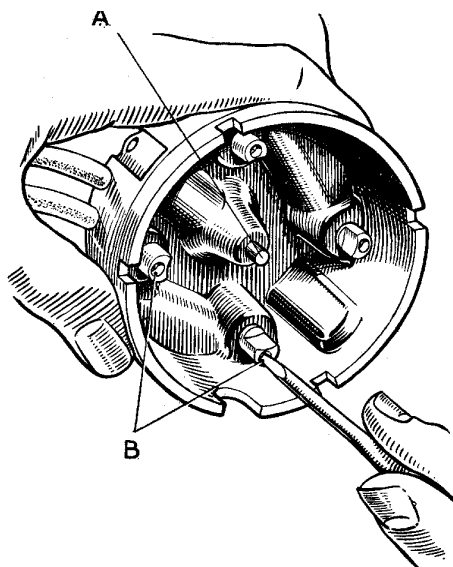


Fig. 33. Connecting H.T. cable to distributor

A – Carbon brush

B – Screws securing cable

To connect cables to the distributor, unscrew the pointed fixing screws on the inside of the moulding and push the cables, which should not be bared but cut off flush to the required length, well home into their respective terminals and tighten the fixing screws. The screw securing the centre cable is accessible when the carbon brush is removed.

REPLACEMENT BULBS. Instructions for replacing most of the bulbs listed here are given in the following pages; in other cases your dealer will be able to help you.

	LUCAS	VOLT	WATT	
Headlamps				
Vehicles numbered prior to 06112001	No. 171	12	36/36	Double filament (straight dip).
Vehicles numbered 06112001 1 onwards:-				
Home models, R.H. headlamp	No. 162	12	36	Single filament.
Home models, L.H. headlamp	No. 300	12	36/36	Double filament. (dip to left).
R.H.D. Export models	No. 300	12	36/36	Double filament. (dip to left).
L.H.D. Export models	No. 301	12	36/36	Double filament. (dip to right).
Sidelamp	No. 207	12	6	Single pole
Stop and tail lamps	No. 207	12	6	Single pole
Instrument panel lights	No. 207	12	6	Single pole
Ignition and mixture control warning lights	No. 970	2.5	5	M.E.S.
Oil pressure warning light	—	12	2.4	M.E.S.

HEADLAMPS.

(Vehicles numbered prior to 06112001).

The setting of the headlamp should be checked by placing the vehicle in front of a blank wall at the greatest possible distance, taking care that the surface on which the vehicle is standing is not sloping relative to the wall.

The lamps are fitted with dual-filament bulbs and must be set so that the main beams of light are parallel with the road and with each other. If adjustment is necessary, slacken the fixing nut at the top of the lamp and move the lamp on its adjustable mounting to the required position. Finally, tighten the locking nut. The mounting is accessible when the bonnet top panel is raised.

To enable the best light to be obtained from the headlamps the bulb filaments must be as near as possible to the focal points of the reflectors. If a bulb is out of focus, the lamps will have a poor range and will cause dazzle to approaching traffic. Before lamps leave the Works, the bulbs are focussed to give the best results and provided that Lucas Genuine Spare Bulbs are fitted as replacements, it should not be necessary to alter the setting. If, however, an ordinary bulb has to be fitted, it may be necessary to re-focus by slackening the screw on the clamping clip and moving the bulb backwards and forwards until the best lighting is obtained. When focussing, it is an advantage to cover one lamp while testing the other. If the lamp does not give a uniform long range beam without a dark centre, the bulb needs adjusting. Tighten the clamping clip after the best position for the bulb has been found.

To remove the lamp front, slacken the fixing screw at the top of the lamp and swing it upwards. Remove the front from the top of the lamp first. The reflector is secured to the lamp body by means of a rubber bead and can be withdrawn when this is removed. When replacing, the projection on the reflector rim must be fitted into the location at the bottom of the lamp body and the reflector must be secured by refitting the rubber bead, the thicker lip of which must be located between the reflector rim and the lamp body. When refitting the lamp front, locate the bottom of the rim first, then press at the top and secure by means of the fixing screw.

HEADLAMPS. (Vehicles numbered 06112001 onwards). To remove the light unit for bulb replacement, first slacken the securing screw and lift off the rim. Remove the dust-excluding rubber, when three spring-loaded adjustment screws will be visible. Press in the light unit against the tension of the screw springs and turn it in an anti-clockwise direction until the heads of the screws can be disengaged through the slotted holes in the light unit rim. Twist the back shell in an anti-clockwise direction and pull it off; the bulb can then be removed.

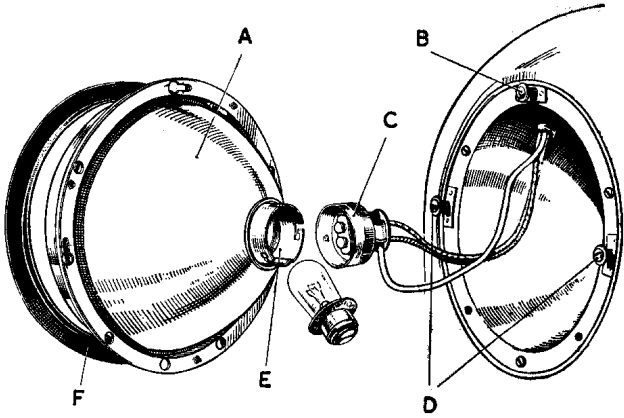


Fig. 34. Headlamp bulb replacement.

A – Light unit.	D – Horizontal setting adjusting screw.
B – Vertical setting adjusting screw.	E – Bulb holder.
C – Back shell.	F – Dust excluding rubber

Fit the replacement bulb in the holder, taking care to locate it correctly and replace the back shell. Position the light unit so that the heads of the adjusting screws protrude through the slotted holes in the flange, press the unit in and turn in a clockwise direction. Replace the dust excluder and front rim.

The headlamps should be set so that the main driving beams are parallel with the road surface. If adjustment is required, remove the rim as described above. The vertical setting may then be made by turning the screw at the top of the lamp and horizontal adjustment can be altered by the screw at each side of the light unit.

SIDE LAMPS. Slacken the screw at the top of the lamp locating it in the scuttle panel and turn the lamp in a clockwise direction until the tongue at the bottom is disengaged from the scuttle. The lamp front and reflector can then be withdrawn.

The bulb is accessible when the holder which is clipped to the back of the reflector is turned to the left and pulled off.

When refitting, the front and reflector, locate the tongue on the lamp in the slot in the scuttle and turn the lamp in an anti-clockwise direction. Finally secure by means of the locating screw.

STOP AND TAIL LAMPS. To effect bulb replacement, slacken the securing screw and swing open the cover; the bulbs are then accessible in the lamp body.

CLEANING LAMP REFLECTORS. The reflectors are protected by a transparent and colourless covering which enables any accidental finger marks to be removed with chamois leather or a soft cloth without affecting the surface of the reflector; metal polish must not be used for cleaning reflectors.

HORN. All horns before being passed out of the Works are adjusted to give their best performance and will give a long period of service without any attention; no subsequent adjustment is required.



"If the horn becomes uncertain in its action."

If the horn fails or becomes uncertain in its action, it does not follow that the horn has broken down. First ascertain that the trouble is not due to some outside sources e.g., a loose connection, short circuit in the wiring of the horn, discharged battery or blown fuse. If the fuse has blown, examine the wiring for the fault and then replace the fuse.

It is also possible that the performance of a horn may be upset by the fixing bolt working loose, or by some component near the horn being loose. If after carrying out the above examination the trouble is not rectified, do not attempt to dismantle the horn, but return it to a Lucas Service Depot or Agent.

WINDSCREEN WIPER. To start the wiper, pull out the handle to disengage it from the switch. Then move the switch lever to the left to the "on" position.

To stop the unit, move the switch downwards to the off position, pull out the handle and turn the end into the top of the switch control.

No adjustment or lubrication is necessary, as the gears are fully lubricated before leaving the Works.

To remove the arm and blade assembly, slacken the fixing nut and tap sharply to release the collet which clamps the arm on to the spindle. Then remove the complete assembly.

When fitting the replacement arm and blade, slacken the securing nut and push the arm fixing brush over the end of the spindle as far as it will go. Secure by tightening the nut.

To fit a new blade only, take out the rubber bush securing the old blade to the arm. Insert the tongue on the replacement blade through the slot in the arm and secure it by fitting the rubber bush through the hole in the tongue.

IGNITION WARNING LIGHT. The ignition switch, besides forming a means of stopping the engine, is provided for the purpose of preventing the battery being discharged by the current flowing through the coil windings when the engine is stopped. A red warning light on the instrument panel appears when the ignition is switched on and the engine is running very slowly or is stationary.

Should the warning lamp bulb burn out, this will not in any way affect the ignition system, but it should be replaced as soon as possible in order to safeguard the battery.

MIXTURE CONTROL WARNING LIGHT. The appearance of the amber mixture control warning light on the instrument panel indicates that the "COLD START" control has been left out inadvertently and must be pushed right in at once.

If the warning lamp bulb burns out, it will not affect the operation of the mixture control, but it should be replaced as soon as possible to ensure that the control is pushed "home" at the earliest possible moment, and so safeguard against unconscious driving with the mixture control in an intermediate position, with consequent high petrol consumption and dilution of the engine oil.

OIL PRESSURE WARNING LIGHT.

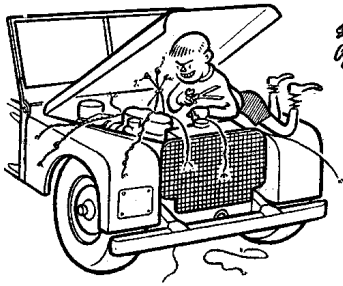
The oil pressure warning light on the instrument panel glows when, for any reason, the engine oil pressure drops below 10 to 12 lb. per sq. in. (0,7 to 0,8 Kg./cm²). It will, therefore, light up when the engine is stationary and will go out when the engine has started and the oil pressure has built up to exceed this figure. Should the warning, light appear at any time during normal vehicle operation, the engine must be stopped immediately and the cause ascertained; usually it will be due to low oil level in the sump.

Should the warning lamp bulb burn out, it should be replaced as soon as possible to safeguard the engine.

IN CASE OF TROUBLE

LOCATION AND REMEDY OF FAULTS

Although every precaution is taken to eliminate all possible causes of



"Failure may develop through damage to the wiring"

trouble, failure may occasionally develop through lack of attention to the equipment, or damage to the wiring. The following pages set out the recommended procedure for a systematic examination to locate and remedy the causes of some of the more probable 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 your local Rover agent who will be able to investigate the defect more closely.

ENGINE FAILS TO START

1. Check that the ignition is switched ON.
2. Check visually that there is sufficient petrol in the tank. (Page 45).
3. Check that the cold start control is set correctly for starting. (Page 15).
 - (i) Engine HOT – Control right IN. Accelerator DEPRESSED.
 - (ii) Engine COLD – control right OUT. Foot clear of accelerator.
4. Check that the engine is being turned at an adequate speed by the starter motor; this speed will be recognised after some experience with the vehicle.

If the cranking speed is too low:-

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

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

5. Remove the cable from each sparking plug terminal in turn and hold it so that the end is about $\frac{1}{4}$ in. (7 mm.) away from some metal part of the chassis, while the engine is turned over; if sparks jump the gap regularly, the coil and distributor are functioning correctly.
 - (i) If the sparks are strong and regular, remove and clean the sparking plugs and re-set the electrode gaps to .023-.026 in. (0,60-0,65 mm.).
 - (ii) If the sparks, are NOT regular:-
 - (a) Check that the distributor rotor is in position.
 - (b) Check that the L.T. connections on the coil and distributor are clean and tight.
 - (c) Check that the distributor points are:-
 1. Clean.
 2. Opening and closing correctly.
 3. Correctly set when open – gap .012 in. (0,30 mm.). See Page 68.
 - (d) Check that current is present at the S.W. terminal on the coil, by disconnecting the wire at the coil end and touching it against the S.W. 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 Agent 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 carburettor and check that petrol is delivered to the carburettor when the ignition is switched “ON.” If petrol is not delivered from the pipe.-
 - (i) Check that the pump “ticks” when the ignition is ON with the pipe still disconnected. If not, the fault is probably in the pump wiring. (Page 46).
 - (ii) Check that the petrol shut-off tap on the sediment bowl is “ON.” (Page 46).
 - (iii) Check that the petrol pipes and filters are clear. (Pages 44-47).
 - (iv) Check that there are no air leaks in the suction line to the pump, in particular at the sediment bowl. (Page 46).

7. Check that the manifold drain pipe (below the carburettor) is not blocked, by depressing the accelerator pedal fully two or three times and noting that a few drops of petrol run out of the drain pipe. If not, remove and clean the pipe.

ENGINE STARTS BUT SOON STOPS.

1. Check that the controls are set correctly. (Page 15).
2. Check the petrol feed to the carburettor, by disconnecting the pipe from the carburettor and noting the petrol flow with the ignition switched "ON."

If there is little or no flow:-

- (i) Check the petrol level in the tank.
- (ii) Check that the air vent in the filler cap is clear.
- (iii) Check the petrol pump for correct operation. (Page 46).
- (iv) Check that the petrol filters are clear. (Pages 44-47).
- (v) Check that the petrol pipes are clear. (Pages 44-47).
3. Check that the carburettor jets are clear, in the following order. (Page 51).
 - (i) Starter petrol jet
 - (ii) Main Jet.
 - (iii) Pilot jet.
4. Check for a fault in the ignition circuit by connecting a wire between the "A" connection on the voltage regulator box and the "SW" connection on the coil, thus bypassing the ignition switch. At the same time, the wire from the ignition switch must be disconnected from the coil.
5. Remove the carburettor top cover and check that there is no water in the float chamber.

ENGINE MISFIRES

Engine running on less than four cylinders, either intermittently or continually.

1. Stop the engine and endeavour to re-start with the starter motor to check the state of the battery and connections. If the battery is in a low state of charge, it will need recharging from an independent electrical supply, and the charging circuit should be checked as directed on Pages 81-82.
2. Remove the lead from each sparking plug in turn and check:-
 - (i) By holding the end of the lead about $\frac{1}{4}$ in. (7 mm.) away from a metal part of the engine with the engine running. Sparks should jump the gap regularly.

If NO SPARK is present on one or more cylinders:-

- (a) Check for moisture on the H.T. leads or distributor.
- (b) Check, clean and re-set the distributor contact-breaker points to .012 in. (0,30 mm.) as necessary. (Page 68).
- (c) 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 as in (i) (a).
 - (b) Check the distributor points as in (i) (b).
 - (c) Check the cap and leads as in (i) (c).
 - (d) Check the L.T. connections for tightness and cleanliness.
 - (e) Check for flashing or "blueing" of the contact-breaker points. If present, the distributor condenser should be replaced.
 - (f) Check for a fault in the ignition circuit by connecting a wire between the "A" connection on the voltage regulator box and the "SW" connection on the coil, thus bypassing the ignition switch. At the same time, the wire from the ignition switch must be disconnected from the coil.
- (ii) For any audible alteration in the running of the engine, as each lead is removed. No alteration will indicate that the sparking plug in question is at fault:-
 - (a) Remove and clean the plug; re-set the gap to .023--.026 in. (0,60-0,65 mm.) as necessary.
 - (b) If still faulty, fit a new sparking plug.

3. If the “missing” is accompanied by “spitting back” through the carburettor, a valve may be sticking. This can often be cured by slowly dropping oil or upper cylinder lubricant into the carburettor intake, while the engine is running.

LACK OF ENGINE POWER.

1. Check that the carburettor throttle is opening fully.
2. Check that the brakes are not binding and that the tyre pressures are correct. (Page 57).
3. Check that the carburettor jets are not blocked (in the following order). See Page 51:-
 - (i) Main jet.
 - (ii) Pump jet.
 - (iii) Economy jet.
4. Check that the carburettor accelerator pump is opening correctly by depressing the accelerator pedal two or three times with the engine stationary and noting that there is a petrol discharge from the manifold drain pipe.
5. Check the ignition timing. (Page 38).
6. Check tappet adjustment. (Page 38).
7. If items 1-6 are satisfactory, it is probable that the engine needs decarbonising and your Rover agent should be consulted.

CHARGING CIRCUIT.

1. Battery in Low State of Charge.
 - (a) This state will be shown by lack of power when starting, poor light from the lamps and hydrometer readings below 1.200, and may be due to the dynamo either not charging or giving low or intermittent output. Check the ammeter reading when the vehicle is running steadily in top gear with no lights in use; a definite steady charge should be indicated. The ignition 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.
 - (b) Examine the dynamo driving belt, take up any undue slackness by turning the dynamo on its mounting. (See Page 42).
 - (c) If the cause of the trouble is not apparent, have the equipment examined by a Lucas Service Depot or Agent.

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 vehicle 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 by a Service Depot or Agent.

STARTER MOTOR

1. Starter Motor Lacks Power or Fails to Turn Engine.

- (a) 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.
- (b) If the engine can be turned by hand, first check that the trouble is not due to a discharged battery.
- (c) 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.
- (d) It is all possible that the starter pinion may have so jammed in mesh with the flywheel, although this is by no means a common occurrence. To disengage the pinion, rotate the squared end of the starter shaft by means of a spanner in the opposite direction to normal rotation.

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 see if the starter pinion is jammed in mesh with the flywheel, releasing it if necessary by rotation of 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.

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 lamps, and that the headlamp bulbs are in focus. (See Page 72).
- (c) If the bulbs are discoloured as a result of long service, they should be replaced. On lamps in which the reflector surface is accessible, see that it is clean.

2. Lamps Light When Switched On, but Gradually Fade Out.
As para. 1.(a).

3. Brilliance Varies with Speed of Vehicle.

- (a) As, para. 1. (a)
- (b) Examine the battery connections, making sure that they are tight, and replace faulty Cables.

4. Lights Flicker.

Examine the circuits of the lamps for loose connections.

5. Failure of Lights.

- (a) As para 1. (a).
- (b) Examine the wiring for a loose or broken connection, and remedy.

STANDARD BODY FITTINGS.

SEATS. Each front seat cushion is fitted with two rubber plugs which locate in holes in the seat-box, thus making it readily detachable, but at the same time ensuring that it will not move when in use.

DOORS. The doors may be removed or replaced as shown in Fig. 35, with the sidescreen detached and the door panel swung forward parallel with the front wing.

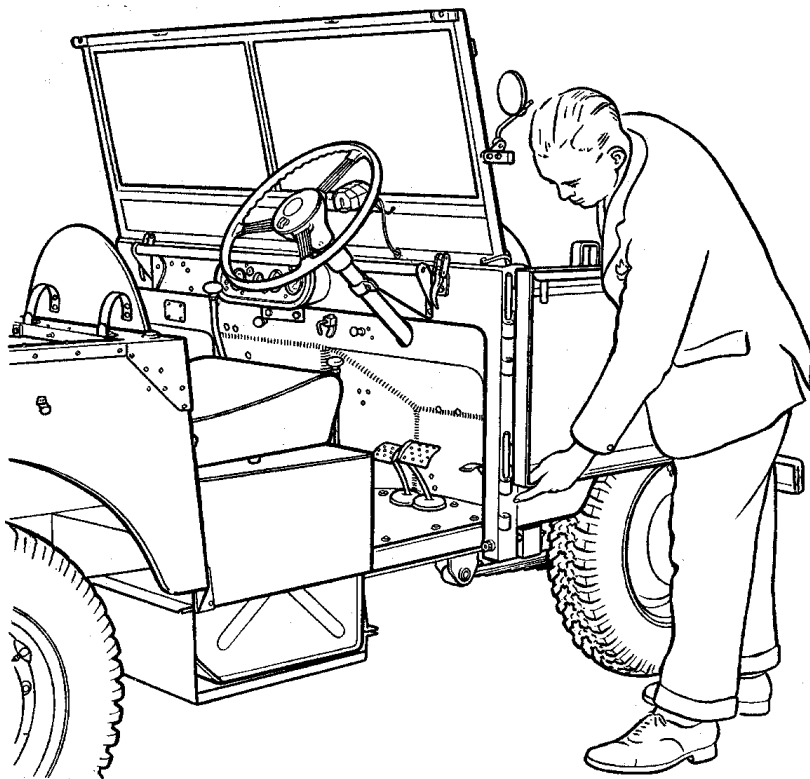


Fig. 35. Door fitting.

SIDESCREENS. The method of fitting the sidescreens is shown in Fig. 36; secure with nuts and washers on the fixing pins to prevent rattles.

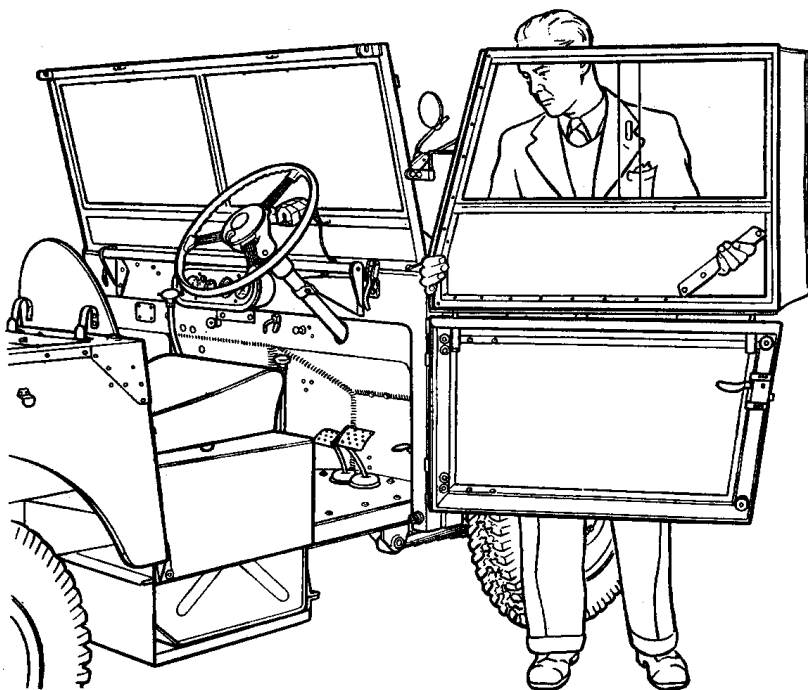


Fig. 36. Sidescreen fitting

HOODS. Two types of hood are available for the Land-Rover, known as the “driver’s” pattern (Fig. 43) which covers the front seat only and the “full-length” which encloses the complete vehicle (Fig. 37); a detachable rear curtain is supplied with the “driver’s” type. In conjunction with the doors and sidescreens, complete all-weather protection is thereby ensured.

FITTING THE FULL-LENGTH HOOD. Select the two U-shaped tubular hood sticks. Slacken off the thumbscrews (C) below the sockets inside the rear corners of the body, insert the rear hood-stick (B) in the sockets and tighten the screws. Fit the front hood-stick (A) in a similar manner. (Fig. 39).

Next select the four thin cranked tubular stays which are fitted between the windscreen and hood-sticks. The two shorter stays (D) with thumbscrews at one end should be fitted between the windscreen and front hood-stick so that the cranks throw the stays outwards; at each end the slot slips down under the thumbscrew on the bracket. Fit the longer stays (E) in a similar way between the front and rear hood-sticks and tighten the four thumbscrews (F). (Fig. 39).

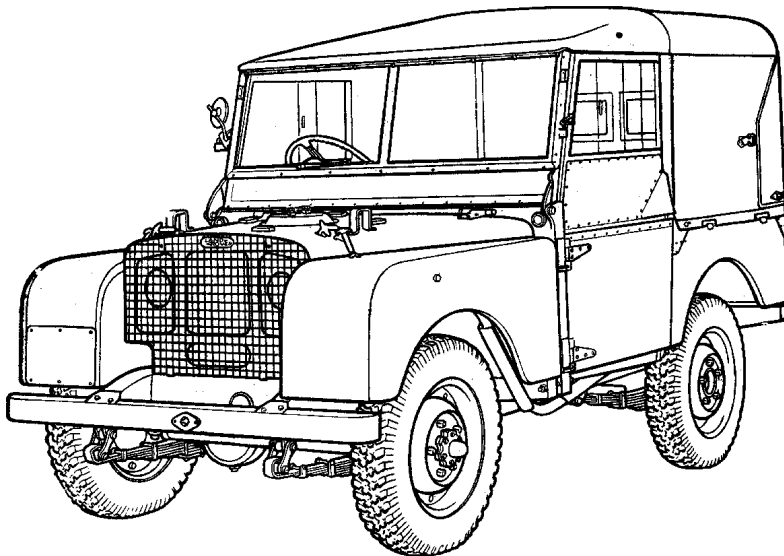


Fig. 37. Full-length hood fitted.

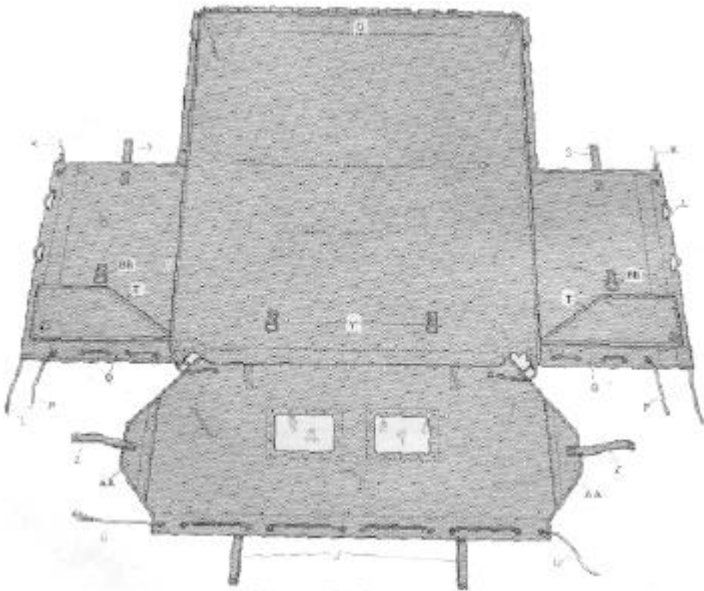


Fig. 38. Full-length hood.

A – Front hood stick
B – Rear hood stick
C – Sockets
D – Front hood stays

E – Rear hood stays
F – Thumbscrews securing stays
G – Front hood eyes
H – Windscreen sockets

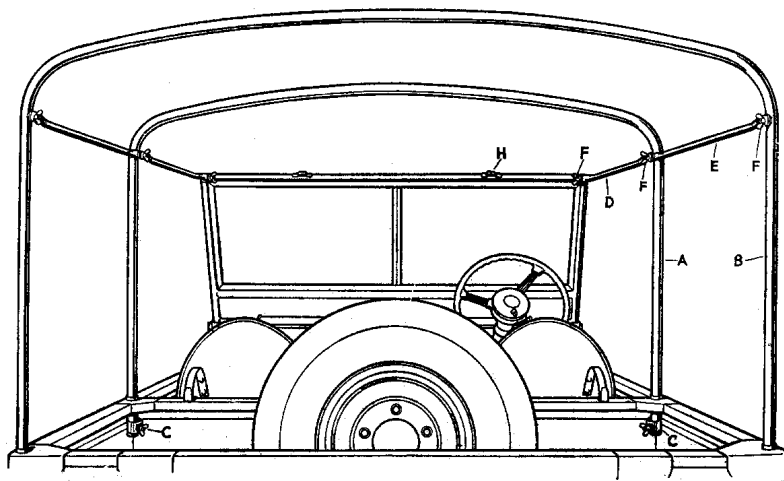


Fig. 39. Hood sticks

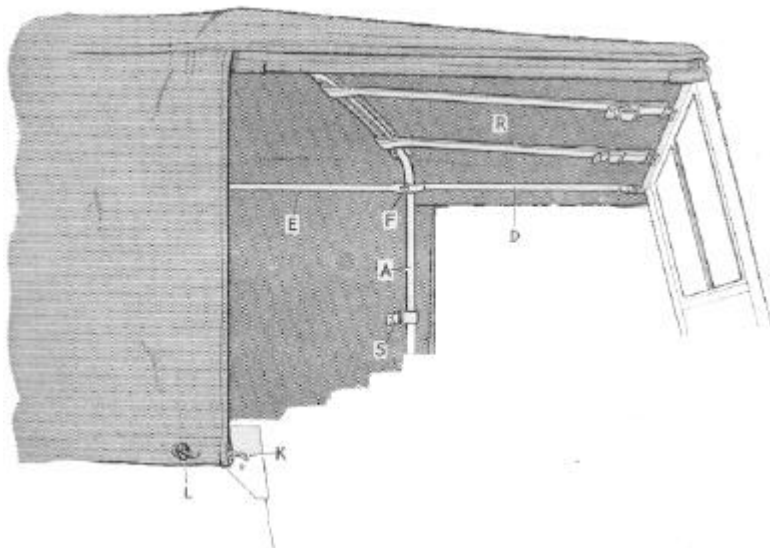


Fig. 40. Front hood straps.

J – Rear hood straps
K – Side rope hooks.
L – Side ropes.
M – Side rope retainers.
N – Rear rope hooks.
P – Rear hood retaining rope.
Q – Rear hood retaining flaps.
R – Front hood straps.
S – Side curtain straps.

T – Side curtain pockets.
U – Rear curtain bottom rope.
W – Rear curtain retainers.
X – Rear curtain straps.
Y – Rear curtain buckles.
Z – Rear curtain side flap straps.
AA – Rear curtain side flaps.
BB – Rear curtain side flap buckles.

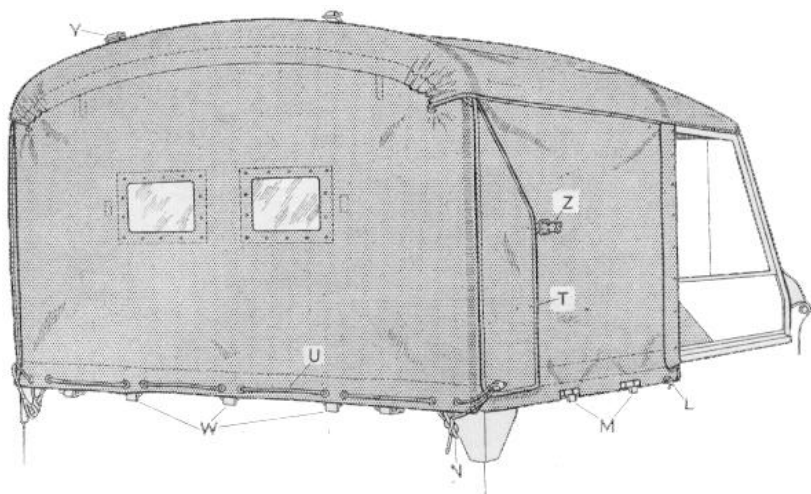


Fig. 41. Full-length hood (rear curtain lowered).

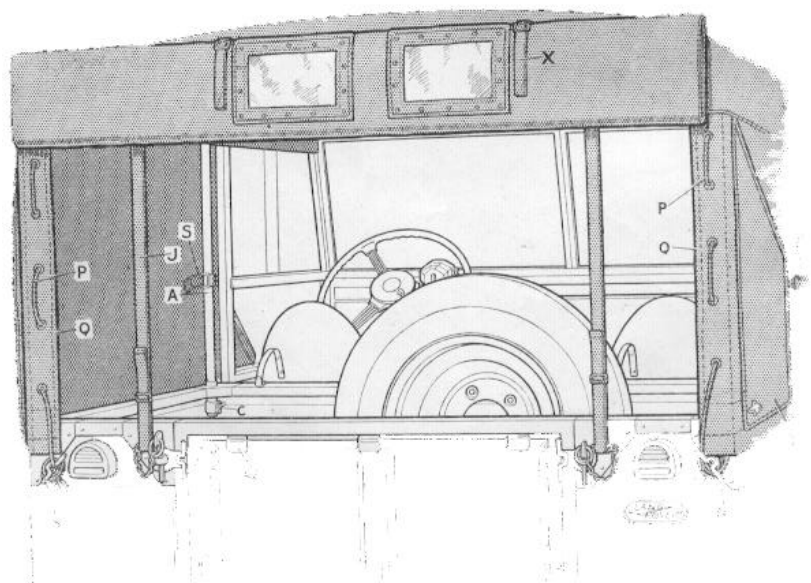


Fig. 42. Full-length hood (rear curtain raised).

Place the hood over the hood-sticks and engage the front hood eyes (G) with the retainers on the outside of the top windscreen rail. Loop the hood straps under the front hood-stick, engage the hooks with the windscreen sockets (H) on the inside front of the windscreen (Fig. 40) and tighten.

Pull the rear hood straps (J) tight and attach to the staples on the rear of the body (Fig. 42).

Secure the side curtains to the front hood-stick, using the small straps (S) sewn to the curtain.

Push the side rope hooks (K) into their holes (Fig. 40), loop the side ropes (L) under the body side retainers (M), pull taut and attach to the rear rope hooks (N).

Pass the rear hood retaining ropes (P) through the holes in the rear curtain, lace them through holes in the rear hood retaining flaps (Fig. 42) and attach to the rear rope hooks.

Attach the loop at one end of the rear curtain bottom rope (U) to the left-hand rear rope hook. Pass the rope round the hook on the left-hand side pocket, back under the tailboard retainers (W), round the hook on the right-hand side pocket and attach it to the right-hand rear rope hook.

Pass the rear curtain side flaps (M) through the side pockets (T), and secure to the hood by means of straps (Z) and buckles (BB).

If it is desired to raise the rear curtain, undo the rear curtain bottom rope and unstrap the side flaps. Fold the side flaps to the centre of the rear curtain, roll the curtain into three folds (Fig. 42) and hold in position by the curtain straps (X) and buckles (Y).

FITTING THE DRIVER'S HOOD.

Slacken off the thumbscrews below the sockets inside the front corners of the body, insert the large U-shaped hood-stick (A) in the sockets and tighten the screws. (Fig. 39). Then fit the two stays (D) between the windscreen and the hood-stick, securing them at each end by means of the thumbscrews (F).

Attach the hooked ends of the two loose webbing straps to the sockets on the windscreen top rail (open ends of the hooks downwards). Fold the edge of the detachable rear curtain over the top member of the hood-stick, pass the ends of the straps through the metal eyes in the curtain and buckle the straps taut; the webbing loops on the rear curtain should be on the outside and the straps at the top corners should not be fastened at this stage.

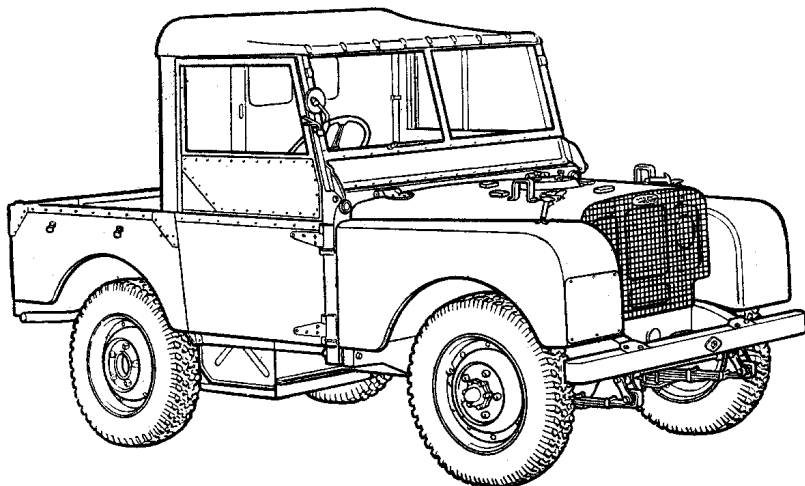


Fig. 43. Driver's hood.

Place the hood over the hood-stick and straps and engage the eyes at the front with the hooks on the outside of the windscreen top rail. The sides of the hood may now be wrapped round the upright members of the hood-stick; secure them by placing the eyes over the wire loops and threading the webbing tongues through the loops. Unhook the roof tension straps from the windscreen, thread them through the webbing loops sewn to the inside of the hood top, re-fasten them to the windscreen and tension.

Secure the rear valances by passing the top straps over the top member, down through the staples and buckling them up; secure the bottom straps to the outer staples on the seat back rest panel.

Now pass the long webbing straps, sewn to the top rear of the hood, down through the loops on the sides of the rear curtain and secure them to the inner staples on the seat back-rest panel.

Hook the three alloy clips at the bottom of the rear curtain under the top rail of the seat back-rest and finally attach and tighten the straps at the top corners of the-rear curtain.

If it is desired to raise the rear curtain without removing it completely, detach the alloy clips from the back-rest panel rail and slide the curtain up the straps to the top; hook the centre clip into the elongated eye in the centre at the top and tuck up the corners neatly.

TOWING ATTACHMENTS. Two forms of towing attachment are supplied as standard equipment for the Land-Rover-a towing plate and a pintle pin.

TOWING PLATE. The towing plate is designed to suit a large variety of farm appliances and machinery, this fact being well shown by the notes which follow regarding the different positions in which it may be fixed to the rear of the chassis. (Fig. 44).

The rear drawbar has fixing holes at 3 in. (75 mm.) centres along its length, whilst the towing plate is, provided with two fixing holes at 3 in. (75 mm.) centres, so that it may be secured at any point along the drawbar.

As the plate is cranked 1 in. (25 mm.) and the standard fixings supplied include distance pieces 1 in. (25 mm.) long, it can be fitted to give any one of eight different heights of the towing eye, ranging from $9\frac{3}{4}$ in. (248 mm.) above ground level, i.e., $9\frac{1}{4}$ in. (235 mm.) below the centre of the power take-off splined output shaft, to $14\frac{1}{2}$ in. (368 mm.) above ground level, i.e., $4\frac{1}{2}$ in. (114 mm.) below the take-off shaft.

The towing hole in the plate is $\frac{7}{8}$ in. (22,2 mm.) dia., positioned 7 in., (178 mm.) to the rear of the fixing poles, i.e., almost exactly in line with the end of the output shaft.

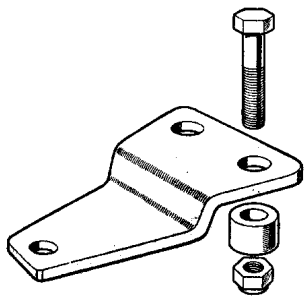


Fig. 44. Towing plate.

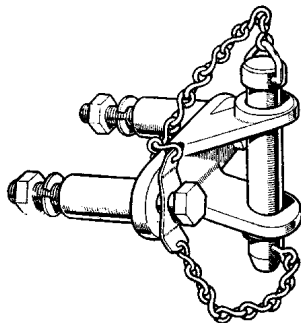


Fig. 45. Pintle pin.

PINTLE PIN. This item comprises a jaw-bracket bolted to the centre of the rear chassis cross-member and a pin retained by a chain; it can be used for towing a trailer of almost any pattern (Fig. 45). Provision is also made for connections to stop and tail lamps at the rear of the trailer if required. A three-pin socket, which is normally protected by a cap when not in use, is fitted in the right-hand side of the rear chassis cross-member, and a suitable plug is carried in the tool-

box. The three pins in the socket are numbered and the connections are as follows:-

No.	Position	Cable colour	
1	Top	Black	Earth to stop, tail lamp casing
2	Bottom L.H.	Green with purple	Feed to stop lamp
3	Bottom R.H.	Red	Feed to tail lamp

EXTRA EQUIPMENT.

TRAFFICATORS. Provision is made for trafficators which can either be fitted to order on a new vehicle or supplied later as extra equipment. (Fig. 46).

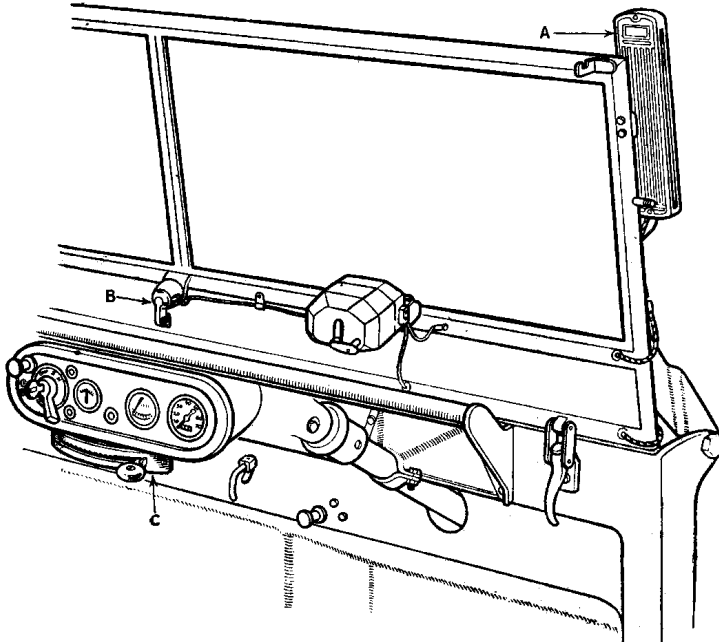


Fig. 46. Trafficators.

A – Trafficator.

B – Trafficator switch.

C – Governor control quadrant.

The operation switch, mounted on the windscreen panel, should be moved through about 45° in the direction of the proposed turn; it must be returned by hand to the central “OFF” position when the turn has been completed.

VEHICLE HEATER. A vehicle interior heater can be supplied as extra equipment; it is mounted above and to the left of the gearbox cover and controlled by a rheostat switch on the dash.

Two shutters on the heater casing control the direction of the warm air from the unit.

Normally the heater delivers air warmed by contact with water circulated through the heater from the engine cooling system, but the fan may also be used to supply cool air, after cutting off the water supply by means of a tap fitted in the water circuit.

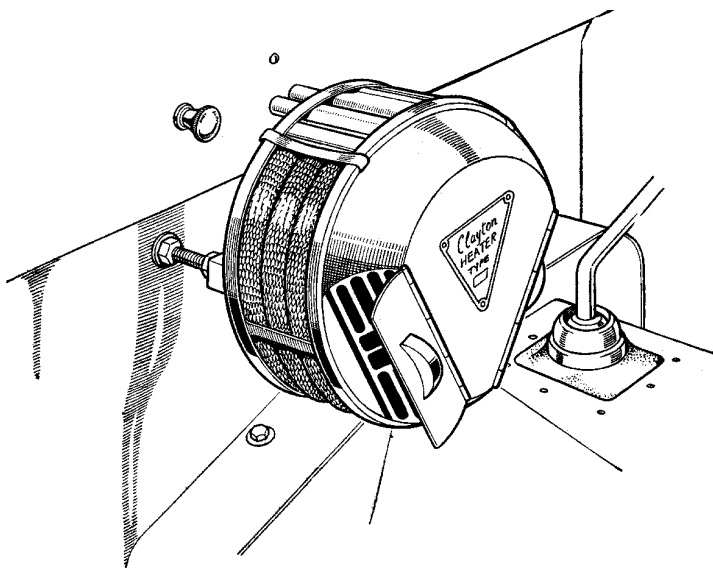


Fig. 47. Vehicle heater.

REAR SEATS. (EXPORT ONLY). Seats to fit over the rear wheel arches can be supplied as extra equipment if required. The seats, each to take two persons, are of the bench type.

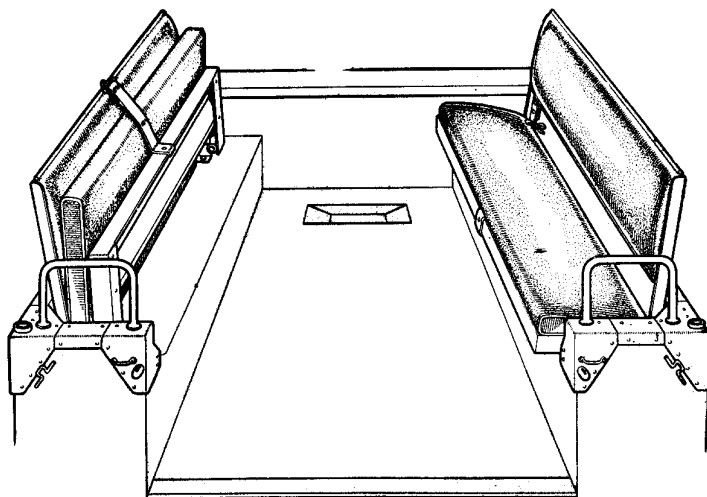


Fig. 48. Rear seat installation.

When not in use, the seats with cushions can be folded up to allow maximum storage space, a strap being provided to hold the seat base up against the back rest.

The seat cushions can also be removed, if desired, being held solely by tapes to the seat frame.

WINDSCREEN VENTILATOR. In warm weather, extra ventilation may be obtained by fitting a hinged flap in place of the metal panel across the lower portion of the windscreen.

The ventilator is secured in the closed position, by means of three clips and wing nuts, against a rubber strip to prevent draughts; when opened it provides a current of cool air across the full width of the vehicle.

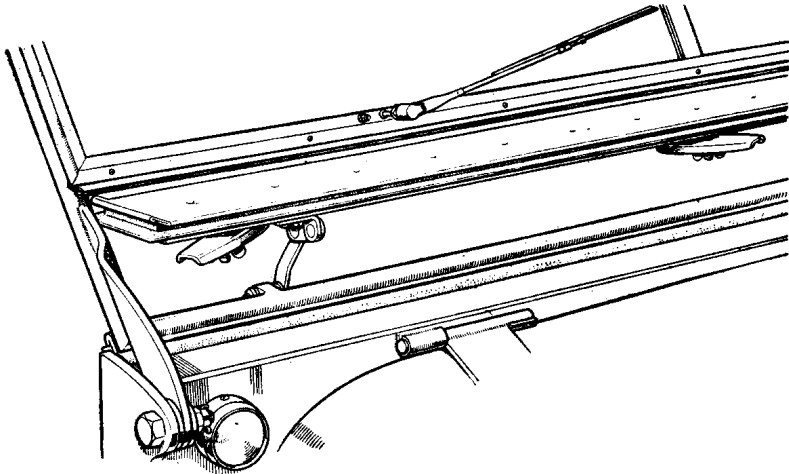


Fig. 49. Windscreen ventilator.

The ventilator is also advantageous when traversing dusty roads, as it greatly reduces the amount of dust blown into the vehicle from the rear by eddy currents of air.

RUBBER PEDAL PADS. Rubber pads are available for the clutch and brake pedals. The fitting of such pads is not advised if the vehicle is operating under continuous wet or muddy conditions, owing to the danger of the feet slipping off the pedals.

SPARE WHEEL CARRIER. The spare wheel is normally stowed in the depression in the body floor as shown in Fig. 2, being retained by means of a clamp and wing-nut. When it is desired to utilise the entire body space for load-carrying, an alternative carrier for mounting the spare wheel on the bonnet top can be supplied for either 6 in. or 7 in. tyres. (Fig. 1). The mounting plate is secured to the bonnet panel with nine rivets and includes two clamps and captive bolts which clamp

over the inner edge of the wheel. To ensure even weight distribution, four rubber support blocks are supplied which should be bolted to the panel so that the weight is taken on the tyre wall; the two thick blocks should be used at the sides and the thin ones at front and rear.

With the spare wheel carried on the bonnet in this way, it is not possible to fold the windscreen into the horizontal position.

COMBINE HARVESTER TOWING PLATE. A special towing plate, can also be way to supplied to order, to suit combine-harvester equipment. It is secured to the rear drawbar in a similar way to the standard towing plate.

ANCHOR BRACKET FOR PINTLE PIN. A special anchor bracket can be supplied as extra equipment, to enable the standard pintle pin to be used with the rear power take-off unit in position.

ALTERNATIVE TOWING JAW. An alternative pattern towing jaw, secured to the rear chassis cross member by means of four bolts, can be supplied in place of the standard type.

POWER TAKE-OFF UNITS. The lay-out of the Land-Rover transmission has been arranged so that power take-off drive for auxiliary equipment can be taken from two points. A pulley drive fitted immediately behind the gearbox (called the centre power take-off) can be used for driving appliances such as an arc welder or compressor mounted on the vehicle, while the take-off unit at the rear, with spline and pulley drive, is for the purpose of driving all kinds of farm machinery, both stationary and towed. Either or both of these drives may be readily installed at any time and their presence in no way affects normal operation of the vehicle.

The drive is taken through a dog-clutch on the rear of the gearbox mainshaft and incorporates a flanged output shaft (Fig. 6). Selector mechanism is bolted to the top of the transfer casing, the selector lever being accessible through the hinged cover plate in the centre of the seat-box (Fig. 3). To engage the power take-off drive, the selector knob must be pushed forward.

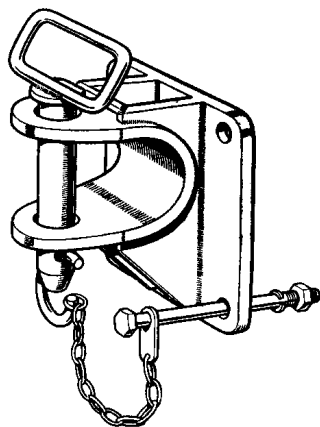


Fig. 50. Alternative towing jaw.

No maintenance attention is required at this point as lubrication is provided by the oil in the transfer casing.

An engine governor must be fitted when either the centre or rear pulley drive is in use.

The procedure for fitting the power take-off drive and selector units to the gearbox is as follows:-

Remove the centre inspection panel from the seat box.

Remove the four nuts and spring washers securing the top cover-plate on the transfer casing and lift off the cover complete with joint washer.

Remove the mainshaft rear bearing housing assembly and joint washer from the rear of the transfer casing, by removing six nuts and spring washers.

Fit the power take-off drive unit assembly and joint washer to the rear of the transfer casing and secure with the six nuts and spring washers.

Fit the power take-off selector assembly and joint washer to the top face of the transfer casing and secure with the four nuts and spring washers; ensure that the selector fork engages with the dog clutch on the drive shaft.

Replace the seat box inspection panel.

CENTRE POWER TAKE-OFF. The driving pulley, usually of the multi-belt pattern, bolts directly on to the flanged output shaft. Appropriate operating instructions will be given by the equipment manufacturer, but mention must be made here of one important maintenance point. When multiple drive belts are used, it is essential that each belt carry an equal share of the load. Some stretching of the belts will occur in services so that should one break or become damaged, all must be replaced. In the event of the belts being removed at any time, they should be marked and replaced in the same pulley grooves as originally fitted.

With belts of the “V” type, the drive is taken on the sides and it is not therefore necessary to adjust them tightly and so put an excessive load on the pulley bearings. The tension is correct when it is possible to depress the belts by thumb pressure approximately  in. to 1 in. (12 mm. to 25 mm.) at a point mid-way between the pulleys.

As the pulley drive is taken from the rear of the gearbox, it follows that the pulley speed will vary with the ratio selected in the main gearbox and a wide speed range is thus obtainable. The table below gives the pulley speed in each gear for each position of the governor control; reference should always be made to this chart to enable the operating speed of the equipment to be set as nearly as possible to that recommended by the manufacturer.

CENTRE POWIER TAKE-OFF PULLIEY R.P.M.

Governor position	Engine R.P.M.	MAIN GEAR CHANGE LEVER IN			
		First	Second	Third	Top
1	1500	500	735	1090	1500
2	1650	550	810	1205	1650
3	1800	600	880	1310	1800
4	1950	650	955	1415	1950
5	2100	700	1030	1525	2100
6	2250	750	1100	1630	2250
7	2400	800	1175	1740	2400
8	2550	850	1250	1850	2550
9	2700	900	1320	1955	2700
10	2850	950	1395	2065	2850
11	3000	1000	1470	2175	3000

When it is desired to use the power take-off with the vehicle stationary, the transfer change lever must be set in the neutral (central) position. To engage the drive, set the engine at idling speed, depress the clutch pedal, engage the required gear in the main gearbox and with the clutch pedal still depressed, engage the take-off drive by pushing the selector lever forward, easing the clutch as necessary to obtain engagement; release the clutch pedal and move the governor quadrant control to the required position.

To disengage the drive, move the governor control to the lowest position, depress the clutch pedal, disengage the take-off drive and return the main gear change lever to neutral. Before re-engaging the drive, always allow the driven equipment to “coast” to a stand-still, to prevent undue strain on the drive

When selecting governor and gear-change lever positions to arrive at the correct speed for driving any particular item of equipment (with the vehicle stationary) the aim should always be to choose as high a gear ratio as possible, provided that the throttle is not fully open when working under load. The use of a high gear will keep the engine speed down to a minimum and so result in economical fuel consumption.

In cases where the equipment is to be driven with the vehicle on the move, the gear and governor positions selected will of course be dictated to a large extent by the vehicle speed required, but an endeavour should be made to keep the main gearbox

ratio as high as possible. The vehicle speeds in all combinations of gears and governor positions are given in the chart on Page 101.

REAR POWER TAKE-OFF. 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 six-splined output shaft (ten-splined on a few early vehicles) is on the centre-line of the vehicle and provides power for towed equipment, such as a mower, binder, etc. (Fig. 51).

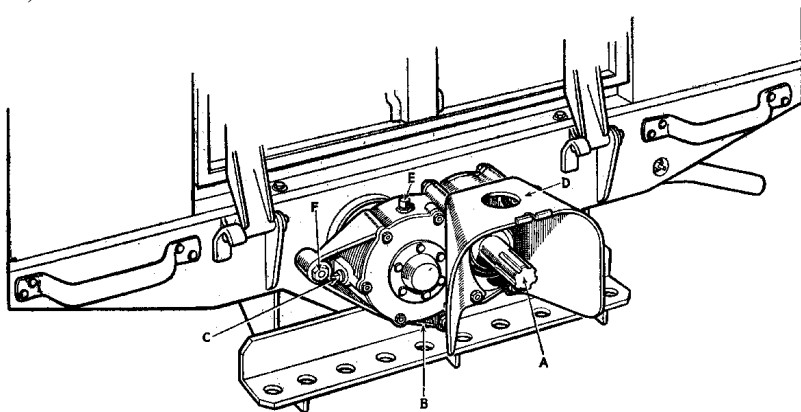


Fig. 51. Rear power take-off

A – 6-splined output shaft.
B – Drain plug (under casing).
C – Oil level/filler plug.

D – Shield for output shaft.
E – Breather.
F – Three attachment bolts.

Assuming the gearbox drive and selector units to be already installed, the procedure for fitting the rear power take-off unit is as follows:-

Secure the propeller shaft to the input flange of the rear take-off unit by means of four self-locking nuts, with the sliding joint at the front.

Pass the sliding joint end of the propeller shaft forward through the holes provided in the rear and centre chassis cross members. Secure the power take-off unit to the rear cross member by means of two long and one short bolts, three spring washers and nuts.

Secure the front end of the propeller shaft to the flanged drive shaft on the gearbox by means of the four bolts and self-locking nuts.

Lubrication nipples are provided at the sliding joint and both universal joints on the propeller shaft; they should be lubricated at intervals of 500 hours, using the correct grade of oil.

The power take-off housing is provided with a drain plug and a combined oil level/filler plug at the side. Check the oil level every 30 hours by removing the level plug; if any oil runs out, allow it to do so, but if the level is low add oil of the correct grade until it reaches the bottom of the level hole. Replace the plug securely.

The oil should be completely drained after the first 25 hours' running and thereafter at every 100 hours, by removing the drain plug in the bottom of the housing. Refill with new oil to the bottom of the level hole; the capacity of the unit is approximately 1 pint (0,5 litre).

Selection of the most satisfactory positions for the governor quadrant control, main gear-change lever and transfer gear-change lever will depend on various factors:-

- (i) Type of ground to be negotiated.
- (ii) Power required to pull any particular item of equipment.
- (iii) Crop conditions.
- (iv) Recommended speed for the equipment to be used.

The table below gives the vehicle and output shaft speeds for all positions of the governor control and in all gears; this should be used to arrive at the correct relationship between the vehicle and take-off shaft speeds for the particular job in hand.

When the rear power take-off is to be used with the vehicle stationary, the transfer lever must be placed in the neutral position; for all other work, the correct transfer ratio must be used, as shown in the chart. The procedure for engaging and disengaging the drive is identical with that for the centre power take-off (Page 98); certain farm machines will be damaged, if driven in reverse and care must be taken in such cases to disengage the take-off drive when it is desired to reverse the vehicle.

A guard is provided for the splined output shaft and this should always be fitted to ensure the safety of the operator.

REAR POWER TAKE-OFF

Shaft Speeds (R.P.M.) and Vehicle Speeds (M.P.H.) with 4.7-1 Axle Ratio and 6.00-16 Tyres.

Governor Position	Transfer Box In	MAIN GEAR/CHANCE LEVER IN:								Engine Speed
		FIRST		SECOND		THIRD		TOP		
		Take-Off R.P.M	Vehicle Speed M.P.H	Take-Off R.P.M	Vehicle Speed M.P.H	Take-Off R.P.M	Vehicle Speed M.P.H	Take-Off R.P.M	Vehicle Speed M.P.H	
1	Low	415	3.0	610	4.4	910	6.5	1250	8.9	1500
	High	415	7.5	610	11.0	910	16.0	1250	22.5	
2	Low	460	3.3	670	4.8	1000	7.2	1375	9.8	1650
	High	460	8.3	670	12.0	1000	18.0	1375	25.0	
3	Low	500	3.6	735	5.3	1090	7.8	1500	10.5	1800
	High	500	9.0	735	13.0	1090	19.5	1500	27.0	
4	Low	540	3.9	795	5.7	1180	8.4	1625	11.5	1950
	High	540	9.8	795	14.5	1180	21.0	1625	29.0	
5	Low	585	4.2	855	6.1	1270	9.1	1750	12.5	2100
	High	585	10.5	855	15.5	1270	23.0	1750	31.5	
6	Low	625	4.5	920	6.6	1360	9.7	1875	13.5	2250
	High	625	11.5	920	16.5	1360	25.0	1875	34.0	
7	Low	670	4.8	980	7.0	1450	10.4	2000	14.5	2400
	High	670	12.0	980	17.5	1450	26.0	2000	36.0	
8	Low	710	5.1	1040	7.4	1540	11.0	2125	15.0	2550
	High	710	13.0	1040	19.0	1540	27.5	2125	38.0	
9	Low	750	5.4	1100	7.9	1630	12.0	2250	16.0	2700
	High	750	13.5	1100	20.0	1630	29.0	2250	40.5	
10	Low	790	5.7	1160	8.3	1720	12.5	2375	17.0	2850
	High	790	14.0	1160	21.0	1720	31.0	2375	42.5	
11	Low	835	6.0	1225	8.8	1820	13.0	2500	18.0	3000
	High	835	15.0	1225	22.0	1820	32.5	2500	45.0	

NOTE.-The 20 and 24 teeth gears in the rear power take-off unit are normally arranged to give a 5:6 reduction in speed between the gearbox output and power take-off output shafts; the above chart applies to this condition.

Occasion may arise when this standard relationship between vehicle speed and power take-off R.P.M. is unsuitable for some particular item of equipment which the Land-Rover is called upon to operate. For this reason, provision has been made to transpose the take-off unit gears, so giving a 6:5 step-up in take-off output speed against gearbox output speed.

With the gears interchanged, the take-off output shaft R.P.M. at any given engine speed are increased by 36/25 over the R.P.M. shown in the table.

For example:-

At governor position 1, i.e., engine speed 1,500 R.P.M., with top gear engaged in the main gearbox, the chart shows that take-off speed is 1,250 R.P.M. with the standard 5:6 reduction. Under the same conditions, but with the gears transposed, take-off speed would be increased to 1,800 R.P.M.

Conversely, an equivalent decrease in vehicle speed at any given take-off speed can be achieved by transposing the gears.

For example: -

Again with top gear engaged in the main gearbox and low transfer ratio employed, the governor setting to give a take-off speed of approximately 1,800 R.P.M. (i.e., governor position 5) results in a vehicle speed of 12.5 M.P.H. with the standard 5:6 reduction. Under the same conditions, but with the take-off gears transposed, the same take-off speed of 1,800 R.P.M. would be achieved at governor position 1, when the vehicle speed would be reduced to 8.9 M.P.H.

The procedure to be followed to transpose the gears is as follows:-

- Remove the rear pulley unit (if fitted).

- Drain off the oil from the take-off unit.

- Disconnect the take-off propeller shaft from the gearbox output flange.

- Remove the take-off unit from the chassis frame.

- Disconnect the propeller shaft from the take-off input flange.

- Remove the input shaft cover plate.

- Remove the split pin, castle nut and plain washer from the end of the input shaft.

- Remove the input shaft bearing housing complete with bearing.

- Remove and preserve the shims from the input shaft and withdraw the 20-teeth gear.

- Withdraw the 24-teeth gear from the output shaft in a similar manner.

- Transpose the gears and reassemble the unit by reversing the sequence of stripping operations.

- It is most important that the two sets of shims removed be replaced on their original shafts.

- Re-fill the unit with one of the oils listed in the lubrication section.

REAR PULLEY DRIVE. The 8in. (200 mm.) rear pulley unit (Fig. 52) is so designed that it may be attached to the rear drive unit in place of the guard by means of four spring washers and nuts, thus making for easy installation and removal.

A combined oil level/filler plug is provided at the side of the housing. Check the oil level every 30 hours by removing the plug; if any oil runs out, allow it to do so, but if the level is low add oil of the correct grade, until it reaches the bottom of the level hole. Replace the plug.

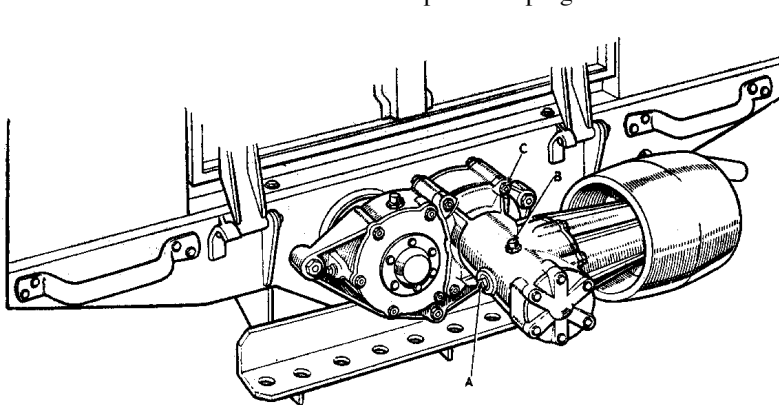


Fig. 52. Rear pulley drive.

A – Oil level/filler plug.

B – Breather.

C – Four attachment points.

The oil should be completely drained after the first 25 hours' running and thereafter at every 100 hours; refill with new oil to the bottom of the level hole; the capacity of the unit is approximately 1 pint (0,5 litre).

It is most important to ensure alignment of the belt in the centre of the pulley and also to obtain the correct tension on the belt; the belt tension is correct when the hand-brake will hold the vehicle and the two sides of the belt cannot be compressed completely together by hand at a point midway between the vehicle and the driven machine.

The table below gives the pulley speed in each gear for each position of the governor control; reference should always be made to this chart so that the operating speed can be set as nearly as possible to that recommended by the equipment manufacturer. When selecting governor and gear-change lever positions to arrive at the correct driving speed, the aim should always be to choose as high a gear ratio as possible, provided that the throttle is not fully open when working under load. The use of a high gear will keep the engine speed down to a minimum and so result in economical fuel consumption.

REAR POWER TAKE-OFF PULLEY R.P.M.

Governor Position	Engine Speed	MAIN GEAR CHANGE LEVER IN:			
		First	Second	Third	Top
1	1500	360	525	785	1070
2	1650	390	575	865	1180
3	1800	430	630	940	1285
4	1950	465	680	1020	1390
5	2100	500	735	1105	1500
6	2250	540	785	1180	1610
7	2400	570	840	1250	1715
8	2550	610	890	1340	1820
9	2700	645	945	1420	1930
10	2850	680	995	1490	2035
11	3000	715	1050	1570	2145

CAPSTAN WINCH. A capstan winch is available for use in conjunction with the rear power take-off; it is mounted on the splined drive unit in place of either the rear pulley or shaft guard.

The winch is designed for 2,500 lb. (1.135 Kg.) pull. It should be used with the engine running at 600 R.P.M., i.e., a fast idling speed. The ratio of the worm drive in the winch is 25:1, so providing the range of rope speeds detailed below:-

CAPSTAN WINCH ROPE SPEEDS

REAR POWER TAKE-OFF RATIO	MAIN GEAR CHANGE LEVER IN:							
	First		Second		Third		Top	
	Ft./min.	Metre/min.	Ft./min.	Metre/min.	Ft./min.	Metre/min.	Ft./min.	Metre/min.
5:6	8.0	2,5	11.8	3,6	17.5	5,3	24.0	7,3
6:5	11.5	3,5	14.4	4,4	25.1	7,6	34.5	10,5

The drive should be engaged by means of the standard power take-off lever on the gearbox with the engine at normal idling speed and without any load on the rope.

A shear pin is used as the only connection between the bollard and the winch drive shaft; this pin will break at the maximum permissible load on the unit and so prevent over-loading.

Two spare pins are supplied with the winch; the correct part must always be used for replacement purposes, as the transmission would be liable to damage if a stronger pin were fitted.

Lubrication attention to this unit is most important. The filler plug on the left of the winch casing is combined with a dipstick, and a drain plug is fitted in the bottom of the casing. The oil level should be inspected at intervals and topped up as necessary to the level mark on the dipstick. At intervals of six months the unit should be completely drained and refilled with fresh oil; the capacity is 3 pints (2 litres).

A grease nipple is provided for lubrication of the bollard shaft, access to this being gained by turning the bollard until the hole provided is in line with the nipple.

CHAFF GUARD. A fine-mesh chaff guard can be supplied as an extra component to prevent the radiator becoming clogged when the vehicle is used for farm work such as reaping, etc.

The guard is clamped behind the existing radiator grille by means of the grille securing bolts.

ENGINE GOVERNOR. An engine governor can be supplied as extra equipment; its use is essential when either the centre pulley or rear power take-off pulley is utilised and it would also be found convenient for many jobs necessitating use of the rear splined output shaft.

It is mounted on a bracket (B) affixed to the front of the thermostat housing (Fig. 53) and is belt-driven from the front groove of the water pump and fan pulley.

The two lower fixing holes (C) in the mounting bracket are slotted to allow for belt adjustment; the tension is correct when it is possible to depress the belt by thumb pressure approximately 1 in. (12 mm.) at a point midway between the fan and governor pulley. Connection to the throttle linkage is by rod (E) which is provided with a length adjustment (F) at the bell-crank end. The link (D) connects the governor to the operating lever and quadrant mounted on the scuttle panel below the instrument board. (Fig. 46).

The oil level in the governor should be checked occasionally by removing the level plug from the right-hand front and the filler plug from the top front of the casing; the correct level is to the bottom of the level hole.

Replenish as necessary by pouring in engine oil through the filler hole until the level is correct; replace both plugs securely.

The quadrant has notches giving 12 positions for the operating lever. The notch to the extreme right is for use when the governor is not required and with the lever in this position the throttle opening is not influenced by the governor mechanism. In order to bring the governor into operation, the control lever must be moved into one of the remaining 11 notches; with

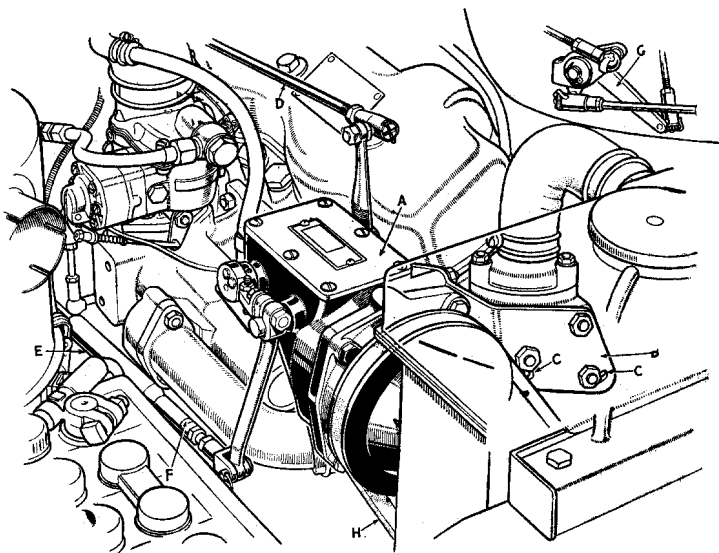


Fig. 53. Engine governor.

- | | |
|---------------------------------|-------------------------------------|
| A – Governor. | E – Linkage to throttle. |
| B – Mounting bracket. | F – Adjustment on throttle linkage. |
| C – Adjustment slots. | G – Carburettor bell-crank |
| D – Linkage to quadrant control | H – Driving belt. |

the lever in the first operating notch, the throttle is opened until the engine speed is 1500 R.P.M. and the governor will then allow for variations in load applied at the power take-off, so controlling the engine speed at that figure. Each succeeding notch represents an increase in engine speed of approximately 150 R.P.M. so that the eleventh and last notch on the extreme left of the quadrant will provide an engine speed of 3000 R.P.M. Instructions for selecting the correct governor control position are given in the “POWER TAKE-OFF UNITS” section.

OIL COOLER. In cases where the Land-Rover is to be used to drive stationary equipment, such as a threshing machine, for extended periods, an engine oil cooler should be fitted.

Such a cooler is available as an extra item of equipment. It incorporates a cooling radiator inserted in the engine oil system and mounted just in front of the radiator; a gauge on the dash panel gives continuous indication of the oil temperature.

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

LAND-ROVER TRAILER.

A two-wheeled Brockhouse trailer has been specially designed for use with the Land-Rover; its normal capacity is 1680 lb. (760 Kg.), but over exceptionally rough ground the load should be restricted to 1440 lb. (650 Kg.). The main features of this trailer are shown at Fig. 54; chief dimensions are as follows:-

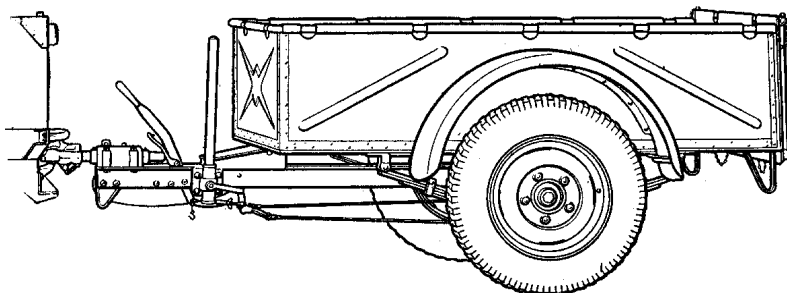


Fig. 54. Brockhouse Land-Rover trailer.

Body length	72 in. (1,82 m.).	
width	36 in. (914 mm.).	
depth	18 in. (457 mm.).	
capacity	27 cu. ft. (0,76 m ³).	
Overall width	61 in. (1,55 m.).	) Identical with
Track	50 in. (1,27 m.).	) Land-Rover.
Overall length	108 in. (2,74 m.).	
Weight (unladen)	620 lb. (280 Kg.).	
Weight (maximum approved gross loaded)	2,300 lb. (1.040 Kg.).	

The wheels and tyres fitted to this trailer are identical with those used for the Land-Rover.

Lubrication nipples are fitted to the drawbar pull pin housing, brake cams and shackle pins (10 in all). Every 1,000 miles (1.500 Km.) grease should be applied at these points.

A special towing ball is supplied with the trailer; this bolts directly on to the rear chassis cross member in place of the standard pintle pin. The towing ball cup on the pull pin is adjustable to allow wear on the towing ball to be taken up, so enabling a snug fit of the ball to be maintained at all times.

The pull pin is interconnected with the brake linkage, so that when the vehicle brakes are applied and the trailer tends to over-run the towing vehicle, the trailer brakes are automatically applied. When reversing, a pivoted catch on the pull pin housing must be swung down to limit the pull pin travel, to keep the brakes in the "off" position.

An adjustment is provided on the brake linkage; this should be checked periodically and set so that the trailer brakes commence to function when the pull pin is pushed in approximately 1 in. (25 mm.).

LAND-ROVER MOBILE WELDING PLANT.

The Land-Rover when converted into a mobile welding plant, can be fitted with both gas and electric welding equipment.

The Lincoln "Shield Arc Junior" welding generator is fitted on the centre-line of the vehicle, mounted partly in place of the centre seat and partly in the rear body compartment. It is driven from the centre power take-off by means of three Vee belts.

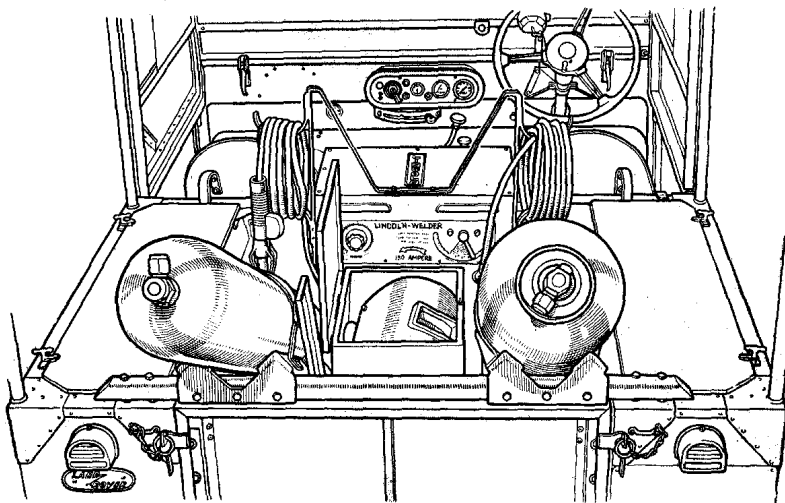


Fig. 55. Land-Rover Welding Plant.

Regulation of the engine speed during welding operations is effected in two ways. Whilst making a welding run, it is necessary for the engine speed to be constant and this requirement is satisfied by means of a standard engine governor. It is undesirable for the engine to run at this speed when not actually welding and an engine speed control is therefore fitted on the inlet manifold, to over-ride the governor under such conditions.

Generator voltage and current output can be varied independently, making the equipment suitable for welding all metals and alloys of any gauge.

Additional equipment such as electrodes, masks, etc., is carried in lockers provided over the rear wheels arches.

Apart from the normal maintenance necessary for any welding generator, the only attention required is periodic checking of the drive belt tension (see "CENTRE POWER TAKE-OFF").

In addition to the electric welding plant, gas welding equipment may also be incorporated. A bridge piece and ramps fitted across the tailboard enable the gas cylinders to be carried alongside the electric generator, while pressure gauges and other items are stored in the lockers and a separate carrying case.

LAND-ROVER STATION WAGON.

The Station Wagon version of the Land-Rover is illustrated below. It is built on the standard chassis and as far as maintenance is concerned, differs from the standard vehicle only in the lighting equipment fitted.

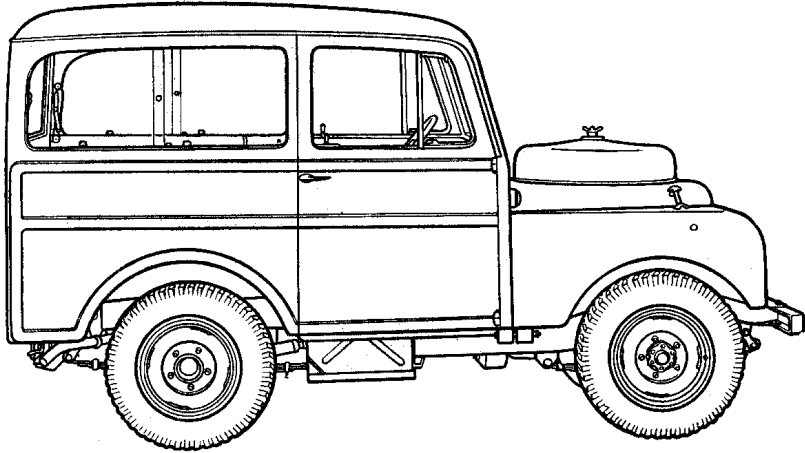


Fig. 56. Land-Rover Station Wagon (side view).

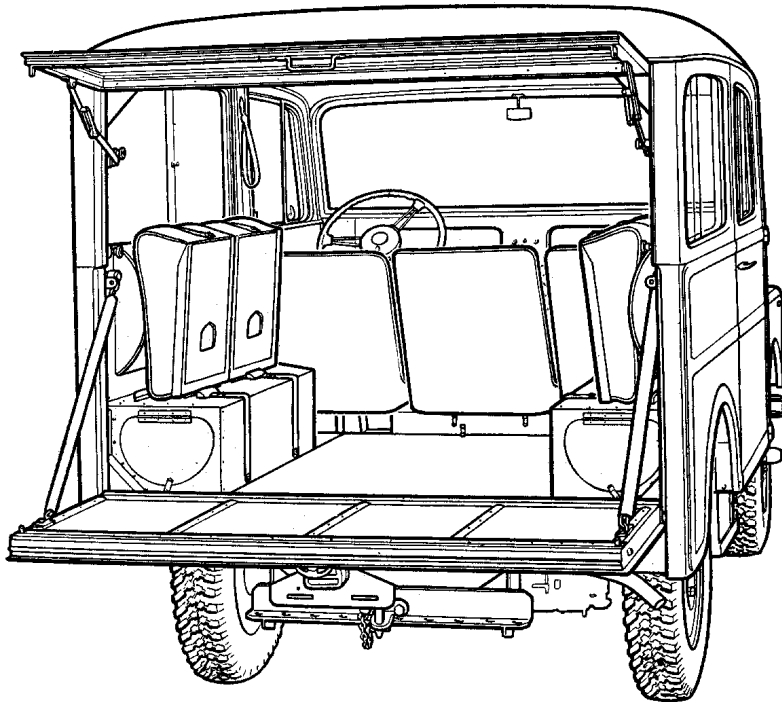


Fig. 57. Land-Rover Station Wagon (rear view).

The passenger's door can be locked by pulling the inner door handle backwards as far as possible; this can be done before the door is shut, or from the inside after the door is shut. The driver's door and tailboard are fitted with locking handles which can be locked using the ignition key. The rear window may be opened from either inside or outside the vehicle, irrespective of whether the tailboard is up or down; it is fitted with spring-loaded linkage which retains it in the fully open position. Finger nuts on the linkage provide means of securing the window in the fully open and closed positions.

The left-hand front seat can be pushed forward to allow entry into the rear of the vehicle through the front door. Four loose seat cushions are fitted in the rear, these can be placed vertically and retained by straps when full stowage space is required.

Hand tools are carried in two lockers at the rear of the rear wheel arches, while the starting handle is clipped to the dash panel.

EXPORT MODELS ONLY.

The lighting equipment differs from that fitted to the standard vehicle in the following respects:-

A trafficator control on the steering column causes the side and tail lamps to flash, thus indicating the direction of the proposed turn. On R.H.D. models, to indicate a turn to the right, the control should be pressed down, while on L.H.D. models, to indicate a similar turn, the control must be pressed up. A warning light on the dash panel flashes in sympathy with whichever lamps are in operation, to serve as a warning should the trafficator control not return automatically after negotiating a slight bend.

A second warning light on the dash panel is connected in series with the headlamps, to prevent their being inadvertently left on in brightly-lit areas. The central number plate is mounted on the tailboard and can be swung down when the vehicle is used with the tailboard horizontal. Its illumination lamp also incorporates a stop lamp which operates automatically, when the brakes are applied.

The twin windscreen wipers are controlled by the push-pull switch on the dash panel, adjacent to the trafficator and head-lamp warning lamps.

Parking of the blades is effected by switching off at the end of the stroke.

An interior light is fitted in the roof and controlled by a switch on the lamp body.

LAND-ROVER DISTRIBUTORS AND DEALERS
BRITISH ISLES
DISTRIBUTORS ARE SHOWN IN BLOCK CAPITALS.

ABERDEEN	Olympia Garage, Kittybrewster. ROSSLEIGH LTD., 58, HUNTLY STREET. Tel. No. 3481. G. & N. Sellar Ltd., The Station Garage, Rennie Wynd. G & G. Thomson, The Square, Cults.
ABERYSTWYTH	West Wales Garages Ltd., North Parade.
ACCRINGTON	Auto Services (Accrington) Ltd., Clock Garage, Whalley Road.
ALCESTER	G. Clarke & Son (Arrow) Ltd., Arrow.
ALFRETON	Rennings Ltd., King Street.
ALTON	F. W. Kerridge Ltd.
ALTRINCHAM	Aiden & Bull, 18, Old Market Place.
ANDOVER	Anna Valley Motors (Andover) Ltd.
ARUNDEL	Hare & Sons (Arundel) Ltd., High Street.
ASHFORD	Stanhay Ltd.
ATHERSTONE	ATHERSTONE GARAGE & ELECTRICAL CO. LTD., LONG STREET. Tel. No. 3169.
AYLESBURY	The Aylesbury Motor Co. Ltd., Kingsbury Square.
AYR	James Tweedie Ltd., Holmston Road.
BALA	Jones Bros.
BALLATER	Lewis Gillies, Victoria Garage.
BANBURY	THE COUNTY GARAGE, THE CROSS. Tel. No. 2458.
BANFF	J. A. Gordon & Co., Central Garage.
BARMOUTH	D. E. DAVIES LTD., THE GREEN GARAGE. Tel. No. 4.
BARNET	Burden & Miles, Westpole Avenue, Cockfosters. Odeon Motors Ltd., Great North Road.
BARNSTAPLE	The County Garage, Bontport Street.
BASINGSTOKE	Basingstoke Motors Co. Ltd., By-Pass Road. Watson's Motors (Basingstoke) Ltd., Wote Street, Basingstoke.
BATH	Wellsway Garage, Wellsway.
BATTLE	Vicarys Ltd., 32, High Street.
BEDFORD	MURKETT BROS., 8, HIGH STREET. Tel. No. 2022 and 2732.
BELFAST	CHARLES HURST LTD., MONTGOMERY STREET. Tel. No. 23848.
BEXHILL-ON-SEA	B. Crossingum, Devonshire Garage. F. DODSON, LTD., SACKVILLE GARAGE, MIDDLESEX ROAD. Tel. No. 238213.
BICESTER	LAYTON & SONS, LONDON ROAD. @ Tel. No. 35.
BIDEFORD	ELLIOT & SONS (MOTORS) LTD., KINGSLEY GARAGE. Tel. No. 132.

BIRMINGHAM	P. Bryant & Sons, Sutton Coldfield. R. H. COLLIER & CO. LTD., COVENTRY ROAD, SOUTH YARDLEY. Tel. No. Acocks Green 1681 (3 lines).
17	Cranmore Bros., 4, Anderson Road, Edgbaston.
13	Ferrington & Clews Ltd., 307/9, Walsall Road, Perry Barr. Henry Garner Ltd., Moseley Motor Works.
11	Arnold Genders & Co. Ltd., 38/46, Alcester Road South. J. W. Gethin, The Grange Garage, Warwick Road, Tyseley.
29	Hunts (Birmingham) Ltd., 197-198, Hagley Road. Leslie Matthews & Co., 717, Pershore Road, Selly Oak.
29	Mists Garage, Hamstead Road & Soho Hill. Handsworth. Patrick Motors Ltd., 479/81, Bristol Road. Premier Motor Co. (Birmingham) Ltd., Aston Road. Reeve & Stedeford Ltd., Berkeley Street, off Broad Street
BLACKBURN	T. Mitchell, Drill Hall Motor Works, 50, King Street.
BLACKPOOL	Brown and Mallalieu. Ltd., Metropole Garage, General Street.
BLACKWOOD, Mon.	J. Alfred Chaston.
BLAIRGOWRIE	Prain Bros., Bridgend.
BOGNOR REGIS	WILMOTTS GARAGE, ALDWICK ROAD. Tel. No. 87.
BOURNE	Raymond Mays & Partner, Spalding Road.
BOURNEMOUTH	EWENS MOTORS LTD., 1-7, LANSDOWNE ROAD, Tel. No. 850.
BRADFORD	Claremont Garage (Bradford) Ltd., Morsley Street. ALBERT FARNELL LTD., 75, MANNINGHAM LANE. Tel. No. 8827-8. Rippon Bros. Ltd., 36, North Parade.
BRECON	BRECON MOTORS LTD., 41, THE WATTON. Tel. No. 23.
BRENTWOOD	Rippon Bros. Ltd., 26-28, High Street.
BRIDGNORTH	The Bridgnorth Garages Ltd., West Castle Street.
BRIDGIEWATER	Bridgewater Motor Co. Ltd., Eastover.
BRIGHOUSE	Ernest Dews Ltd., Bradford Road, Bailiffe Bridge.
BRIGHTON	A. S. TILLEY (GARAGE) LTD., DAVIGDOR ROAD, HOVE 2. Tel. No. 6232 (3 lines).
BRISTOL, 8	WINDMILL & LEWIS LTD., 11/15, MERCHANTS ROAD, CLIFTON. Tel. No. 33021.
BROMLEY	K. J. Motors Ltd., 137-149, Widmore Road.
BROMSGROVE	JOHN BRYANT & SONS LTD., 120-123, HIGH STREET. Tel. No. 2212/3.
BUCKINGHAM	Phillips & Sons, Motor Engineers.
BUDE	Cann, Medland & Co., The Garage.
BURNLEY	Hebden Bros. Ltd., 221-7, Accrington Road.

BUXTON	W. R. Sanders Ltd.
CAMBERLEY	Herman Soloman & Sons, High street.
CAMBORNE	Williamsons Motors, Church Street.
CAMBRIDGE	KING & HARPER, 6 & 7, BRIDGE STREET. Tel. No. 3201.
CANNOCK	Bird & Yates Ltd., Walsall Road.
CANTERBURY	BARRETT'S OF CANTERBURY LTD., 28/30, ST. PETER'S STREET. Tel. No. 2288 (2 lines).
CARDIFF	MORSMITH MOTORS LTD., FREDERICK STREET. Tel. No. 6266/7.
	Yapps Garages, Llanishen.
CARLISLE	STANWIX GARAGES LTD., SCOTLAND ROAD. Tel. No. 56.
CARMARTHEN	W. EDWARDS & SON, TOWY GARAGE. Tel. No. 682.
CHELMSFORD	Pollards Garages Ltd., Broomfield Road.
CHELTENHAM	STEELS GARAGES LTD., HIGH. STREET. Tel. No. 3033.
CHESTER	Dee Motor Co. Ltd., 64-66, Broughton.
CHESTERFIELD	CAVENDISH MOTORS LTD., HOLYWELL STREET. Tel. No. 2468.
CHICHESTER	Masons Garage (Chichester) Ltd., 19, Southgate.
CHIPPENHAM	BURRIDGES MOTOR WORKS, STATION HILL. Tel. No 2215/6.
CHISLEHURST	G. Hyde, High Street.
CIRENCESTER	Steels (Cirencester) Ltd., Dyer Street.
CLAY CROSS	Kennings Ltd.
CLECKHEATON	Cleckheaton Eng. & Motor Co., 179-197, Bradford Road.
CLEVEDON	Willcocks (Clevedon) Ltd., West End Motors.
COCKERMOUTH	R. Wild and Son, Royal Garage.
COLCHESTER	SPURLING MOTOR BODIES LTD, 103, NORTH STATION ROAD. Tel. No. 2437.
COLERAINE, Co. Derry	Stuart Co. (Motor. Works). Bridge Street.
COUPAR ANGUS	Lamb & Gardener.
COVENTRY	GUYVERS (COVENTRY) LTD., GREYFRIARS LANE. Tel. No. 63224.
CROYDON	Leatherwoods Garage Ltd., 203, St. James' Road.
DARTFORD	B. & S. Gelston & Co. Ltd., 27-29, Lowfield Street.
DERBY	ANDREWS GARAGE (DERBY) LTD., BECKETT STREET. Tel. No. 45868.
DEWSBURY	GEORGE BOX LTD., ALDANS ROAD. Tel. No. 653 (2 lines).
DONCASTER	Bailey & Law, Highfield Road Garage.
DORKING	Dorking Motor Co. Ltd., Reigate Road.
DORCHESTER	TILLEY'S, 45, SOUTH STREET. Tel. No. 414/5.

DUDLEY	Westleys (Dudley Garage) Ltd., Castle Hill.
DUMFRIES	DUMFRIES MOTOR CO., 85, ENGLISH STREET. Tel. No. 1128/9.
DUNDEE	ROSSLEIGH LTD., NETHERGATE. Tel. No. 2064/5.
DUNS, Berwick	Aitchison & Sons Ltd., 15, Murray Street.
EASTBOURNE	CLARK & LAMBERT LTD., TRINITY PLACE GARAGE. Tel. No. 4660 (2 lines).
EDINBURGH	J. Forrest, 4, Ratcliffe Terrace. M. C. Hutchinson, Ardmillan Motor Works. Leggate & Co., 70, Slateford Road. ROSSLEIGH LTD., ANNADALE STREET. Tel. No. 24043 and 30001. J. M. Sloane & Co Ltd., Bedford Road.
ELGIN	Elgin Motors Ltd., South College Street.
ELLON	Neil Ross, Ellon Motor Works.
ENFIELD	C. F. Shepherd & Co. (Enfield) Ltd., Montjoy Works, Enfield Highway.
EPSOM	Page Motors Ltd., 78, High Street.
ETCHINGHAM, Sussex	Covell & Foord, London Road, Hurst Green.
EVESHAM	H. Goodall & Sons Ltd., High Street.
EXETER	THE BEDFORD GARAGE, BEDFORD CIRCUS. Tel. No. 3633.
FAREHAM	Cedar Service Station Ltd., East Street.
FALFIELD, Glos.	H. G. Sams & Son, Whitefield Garage.
FALKIRK	Blackadder Motor Co. Ltd., Garrison Garage. J. M. Millar Ltd., Callender Road.
FARNHAM	Swain & Jones, East Street. The Tourist Trophy Garage Ltd., East Street.
FERNHURST	Burrows and Paine.
FLEET	STEVENS BROS. (FLEET) LTD., FLEET ROAD., Tel. No. 65
FOLKESTONE	Auto Pilots Ltd., Cheriton Gardens.
GALASHIELS	Purvis & Sons Ltd., Market Street.
GATESHEAD-ON-TYNE	Bensham Motor Co., Bensham Road.
GILLINGHAM	BALL OF GILLINGHAM, BROADWAY GARAGE, LONDON ROAD. Tel. No. 5543.
GLASGOW, S.4	Diack & Lambie Ltd., Lime Park Garage. JAS. GIBBON (MOTORS) LTD., 104, WEST NILE STREET. Tel. No. Doug. 3452 and 4505.
GLOUCESTER	Barnes Garage, Longsmith Street.
GOODMAYES, Essex	F. G. Smith Motors Ltd., High Road.
GRANTHAM	NORTH ROAD GARAGES (GREAT PONTON) LTD., GREAT PONTON. Tel. No. Gt. Ponton 202.
GRAVESEND	Spooner Motors Ltd., The Grove.

GRIMSBY	D. H. & A. H. BLOOMER, WEST ST. MARY'S GATE. Tel. No. 5488.
GUERNSEY	LE LACHEURS GARAGE, DOYLE ROAD, ST .PETER PORT. Tel. No. 923.
GUILDFORD	Coombs & Son (Guildford) Ltd., Portsmouth Road.
HALIFAX	Hoffmans Ltd., Huddersfield Road.
HARPONDEN	Putterill Bros., High Street.
HARROGATE	GLOVERS OF RIPON, 1, LEEDS ROAD SOUTH. Tel. No. 81263/5.
HARROW	Middlesex Motors (Harrow) Ltd., Station Road.
HAVERFORDWEST	GREENS MOTORS LTD., JUBILEE GARDENS. Tel. No. 741 (3 lines).
HAWICK	A. & J. Guthrie, 61, High Street.
HAYWARDS HEATH	E. R. Morris, Franklin Garage.
HEREFORD	W. HOLLOWAY & SONS, 14-15, COMMERCIAL ROAD. Tel. No. Not to hand.
HERTFORD	The Hertford Motor Co. Ltd., 143, Parliament Square.
HEXHAM	Wilson & Vass Ltd., Station Garage.
HITCHIN	Ralph E. Sanders & Sons Ltd.
HOCKLEY HEATH, Warks.	Charles Hull Ltd.
HORSHAM	RICE BROS. (HORSHAM) LTD., 4, SPRINGFIELD ROAD.. Tel. No. 500 (3 lines).
HUDDERSFIELD	W. H. ATKINSON & CO. LTD., 4, ST. JOHNS ROAD, Tel No. 4505/6. Rippon Bros. Ltd., Viaduct Street.
HULL	G. Sykes & Son, Crossland Moor Mills. GORDON ARMSTRONG (HULL) LTD., ANLABY ROAD. Tel. No. 32882 (2 lines).
HUNSTANTON	W. H. Johnson & Sons Ltd., Westgate.
HUNTINGDON	MURKETT BROS., MARKET PLACE. Tel. No. 298/9.
INVERURIE	W. J. Wallace, 72, Market Place.
INVERNESS	MACRAE & NICK LTD., 36, ACADEMY STREET. Tel. No. 1000.
IPSWICH	BOTWOODS LTD., MAJORS CORNER. Tel. No. 2271 (4 lines).
JERSEY	PARAGON GARAGES (JERSEY) LTD., 95, HALKETT PLACE, ST. HELIER. Tel. No. Cen. 55.
KEIGHLEY	Francis E. Cox (Keighley) Ltd., Bradford Road.
KELSO, Roxburgh	T. A. Watson, Crawford Street, Kelso.
KENDAL	H. J. CROFT LTD., 84/92, HIGHGATE. Tel. No. 188.
KENTON, Middx.	Dry's Garages Ltd., 85, Kenton Road.
KESWICK	Keswick Motor Co. Ltd.
KIDDERMINSTER	Laughton Goodwin, George Street.
KILMARNOCK	The Princes Street Motor Co. Ltd.

KING'S LYNN	W. H. JOHNSON & SONS LTD., ST. JAMES STREET. Tel. No. 2281.
KINGSTON-ON-THAMIES	H. Beart & Co. Ltd., 102, London Road.
KIRKCALDY	ROSSLEIGH LTD., PARK PLACE. Tel. No. 2671.
KIRKCUDBRIGHT	James McMurray & Son.
LANCASTER	Barton Townley, Penny Street.
LEAMINGTON SPA	MIDLAND AUTOCAR (LEAMINGTON) LTD., 14/24, RUSSELL STREET. Tel. No. 105.
LEATHERHEAD	Sandfords Motors, Woodbridge Corner Garage.
LEDBURY	C. Hopkins & Sons, New Street.
LEEDS, 9	Adams Motor Service, 101, Stoney Rock Lane.
7	Rippon Bros. Ltd., 73, Albion Street.
LEICESTER	ARNOLD G. WILSON LTD., 232, HARROGATE ROAD, CHAPEL ALLERTON. Tel. No. 41014/5.
	Clulow & Orton Ltd., Charles Street.
	W. E. STURGESS & SONS LTD., BRAUNSTONE GATE. Tel. No. 22047 (2 lines).
LEIGH, Lancs.	Victoria Garage (Leigh, Lancs.) Ltd., Chapel Street.
LEITH	Belwatt, 11/15, Assembly Street.
LEOMINSTER	James Fryer Ltd., Borough Garage.
LEWES	Ruggs Ltd., Station Garage.
LICHFIELD	KENNINGS LTD., ST. JOHN STREET. Tel. No. 3113/4.
LINCOLN	A. R. Hill Ltd.
LIVERPOOL	J. Blake & Co. Ltd., 10, Bold Street.
LLANDILO	The Griffiths Garage, Rhosmaen Street.
LOCKERLEY, Hants.	Coombs Garage, Bates Green.
LONDON, W.1	Jack Barclay Ltd., 12/13, St. George Street, Hanover Square.
S.W.13	Boon & Porter Ltd., Castleman, Barnes.
W.C.2	British & Colonial Motors Ltd., 140, Long Acre.
N.W.1	Car Mart Ltd., Stanhope House, 320, Euston Road.
S.W.19	Evans (Wimbledon) Ltd., Alexander Road, Wimbledon.
S.E.18	Furlongs Ltd., 160 Powis, Street, Woolwich.
N.16	R. Garwood & Sons Ltd., 45, Stamford Hill.
W.C.1	Gladwell & Kell (1932) Ltd., Ampton Street Works) Grays Inn Road.
N.W.4	Hale Garage, Buckingham Chambers, 45, Vivian Avenue.
E.18	Harvey Hudson & Co. Ltd., 45, High Road, Woodford.
N.W.1	HENLYS LTD., HENLYS' HOUSE, 885, EUSTON ROAD. Tel. No. Euston 4444.
N.14	Holmes & McCarthy, 39, Chase Side, South Gate.
W.1	Kevill, Davies & March Ltd., 41/42, Hates Mews, Berkeley Square.
W.5	Gordon Lovett Ltd., 45, The Mall, Ealing.

LONDON, W.1	Mann, Egerton & Co. Ltd., 68, York Way.
N.W.1	Marylebone Garage Ltd., 6/11, Dorset Close.
N.22	Meakers Garage Ltd., Whymark Avenue, Wood Green.
S.W.1	H. C. Nelson (1942) Ltd., 11, Appletree Yard.
N.W.1	George Newman & Co., 369, Euston Road.
S.W.6	Newnhams Ltd., 235-7-9, Hammersmith Road.
W.1	Jack Olding & Co. Ltd., 8/10, North Dudley Street, Oxford Street.
N.W.1	Pass & Joyce Ltd., c/o Henleys' House, 385/7, Euston Road.
E.7	R. P. Powell (Motors) Ltd., 321, Romford Road, Forest Gate.
W.1	Lionel H. Pugh, 13/14, Brooks Mews.
N.W.2	G. T. Shaffer & Co. Ltd., 82-106, Cricklewood Lane.
S.W.16	South London Motors Ltd., 512-522, Streatham High Road
S.E.5	Steel, Griffiths & Co. Ltd., 295, Camberwell New Road.
W.1	University Motors Ltd., 7, Hertford Street.
LOUGHBOROUGH	Archie E. Moss Ltd.
LUDLOW	The Ludlow Motor Co., Corve Street.
LUTON	DUNHAM & HAINES, 46, CASTLE STREET. Tel. No. 2100/1.
	Plowmans Ltd., Hitchin Road.
MACCLESFIELD	T. Simister, Station Street Garage.
MAIDSTONE	CAFFYNS LTD., ASHFORD ROAD. Tel. No. 4049 (2 lines).
MALVERN	Bowman & Acock Ltd., Pickersleigh Garage, Worcester Road.
MANCHESTER	Lockwood & Greenwood Ltd., Audenshaw Road, Audenshaw.
	A. Freeman Ltd., Grosvenor Garage, Burnage Lane, Levenshulme.
	Henlys Ltd., 1/5, Peters Street.
	DAVID ROSENFELD LTD., CHEETHAM HILL ROAD. Tel. No. Blackfriars 2302.
MANSFIELD	NORTH NOTTS. MOTORS, NOTTINGHAM ROAD. Tel. No. 1366.
	St. Marys Motor Co. Ltd.
MARKET HARBOROUGH	R A. Pither Ltd.
MAYFIELD, Sussex	Melton Car & Eng. Co. Ltd., Burton Street.
MELTON MOWBRAY	T. H. Russell Ltd., The Garage, Petersfield Road.
MIDHURST	Ratcliffe & Thornton Bros. Ltd., Lomeshaye Garage, Manchester Road.
NELSON	F. W. Apperley & Sons, Pickering Road.
NEW BRIGHTON	GREEN & WHINCUP, WEST STREET GARAGE. Tel. No. 251.
NEWBURY	

NEWCASTLE-ON-TYNE	ROSSLEIGH LTD., OLYMPIA GARAGE, 1, NORTHUMBERLAND ROAD. Tel. No. 62211.
NEWMARKET	CRISSWELLS GARAGE (1944) LTD., HIGH STREET. Tel. No. 46617.
NEW MILTON, Hants.	Coopers Garages (New Milton) Ltd.
NEWPORT, Mon.	BOULDS (MOTORS) LTD., 53-57, CLARENCE PLACE. Tel. No. 3805.
NEWPORT, I.O.W.	Frank Cheverton Ltd.
NEWTON-LE-WILLOWS	A & B Motors (Newton-le-Willows) Ltd., Mill Lane.
NORTHALLERTON	Lancashire Car Distributors Ltd.
NORTHAMPTON	Kellet & Pick, High Street.
NORWICH	GROSE LTD., MAREFAIR. Tel. No. 2111/2.
NOTTINGHAM	MANN, EGERTON & CO. LTD., 5, PRINCE OF WALES ROAD. Tel. No. 20481 (6 lines).
OLDHAM	C. H. TRUMAN & CO. LTD., 61a, MANSFIELD ROAD. Tel. No. 43087/9.
OLD HILL	Paragon Motor Co. (Oldham) Ltd., King Street.
OMAGH, N.I.	Old Hill Motors Ltd., Halesowen Road.
OXFORD	Charleton & Sons, Derry Road.
OXTED	J. COXETER & CO. LTD., 40/41, PARK END STREET. Tel. No. 2275.
PAIGNTON	Spark & Co. Ltd., Raleigh Chambers.
PAISLEY	George Perry, Preston.
PENRITH	John McFayden & Co. (Paisley) Ltd., Shuttle Street.
PENRYN	Armstrong & Fleming, King Street.
PENZANCE	T. H. Nicholls Ltd., Penryn Garage.
PERSHORE, Worcs.	TAYLORS (GARAGE) LTD., GREEN MARKET. Tel. No. 198.
PERTH	The Abbey Garage.
PETERBOROUGH	Stirton & Co., 55/57, Caledonian Road.
PETERHEAD	MURKETT BROS., BRIDGE STREET. Tel. No. 3481.
PLYMOUTH	Simpson & Son (Peterhead) Ltd., 14, Prince Street.
PORTADOWN, N.I.	R. HUMM & CO. LTD., ALEXANDRA ROAD. Tel. No. 5055.
PORTSMOUTH	Edwin May, 128, Bridge Street.
PORT ST. MARY, I.O.M.	LININGTON BROS. (1946) LTD., Swan Street. Tel. No. 74102.
PRESTON	CHRISTOPHER J. CONNALL, SHORE GARAGE, THE SMELT. Tel. No. 9.
RAMSGATE	Merigolds Ltd., 147, Church Street.
READING	A & B Garages Ltd., Grange Road.
REDDITCH	T. BAKER & SONS, FRIAR STREET. Tel. No. 3976.
	G. W. Horton & Sons, George Street.

RHYL	THE GROSVENOR MOTOR CO., 8, BODFOR STREET. Tel. No. 929.
ROSS-ON-WYE	T. C. Longford Ltd., Ross Motor Works.
ROTHERHAM	Rotherham Motor Co. Ltd., Corporation Street.
RUGBY	SAM ROBBINS LTD., BILTON ROAD. Tel. No. 2063.
SALISBURY	ANNA VALLEY MOTORS (SALISBURY) LTD., 86/106, CASTLE STREET. Tel. No. 2207.
SANDBACH	Cookes Garages, Crewe Road.
SCUNTHORPE	Pavilion Garage, 24a, Normanby Road.
SELBY	F. E. Sanderson, James Street.
SEVENOAKS	Caffyns Ltd., 166, High Street.
SHEFFIELD	CRABTREE & NICOL. CITY GARAGE,, PINSTONE STREET. Tel. No. 27551 (3 lines).
SHERBORNE	E. Childs & Sons, Long Street.
SHREWSBURY	VINCENT GREENHOUS, GREYFRIARS MOTOR WORKS. Tel. No. 3051 (5 lines).
SLOUGH	LEIGH PARK MOTORS LTD., HOUGHTON ROAD, DATCHET. Tel. No. 54/55.
SOUTHAMPTON	SOIJTH WESTERN GARAGES (SOUTHAMPTON) LTD., MARSH LANE, CENTRAL BRIDGE. Tel. No. 2313/4.
SOUTH MOLTON	Moor's Garage (South Molton) Ltd., 56, South Street.
SOUTHPORT	R. Bamber & Co. Ltd., Scarisbrick.
SPALDING	H. LEVERTON & CO. LTD., BROAD STREET. Tel. No. 2306.
SPILSBY	Leslie S. Dodds (1936) Ltd., Old Town Hall.
STAFFORD	ATTWOODS GARAGE LTD., LICHFIELD STREET. Tel. No. 479.
STAINES	Dobsons (Staines) Ltd.
ST. ALBANS	W. M. Couper Ltd., Catherine Street.
ST. AUSTELL	Hill & Phillips (1939) Ltd., Gover Road.
ST. HELENS	Barlow Motor Co. Ltd., Prescott Road, Toll Bar.
STAMFORD	Wheatleys Garage, Scotgate.
STANSTEAD, Essex	N. E. & T. A. Mayhew Bros., Cambridge Road and Station Garage.
	F. B. Motors Ltd., Bull's Corner.
STIRLING	ROSSLEIGH LTD., WALLACE STREET. Tel. No. 635.
ST. LEONARDS-ON-SEA	Coombs' Motors Ltd., 19, Norman Road.
STOCKPORT	Drakeson Motor Co. Ltd., Wellington Road South.
STOCKTON-ON-TRENT	DINSDALES SERVICE GARAGE, 29, YARM LANE. Tel. No. 66013.
STOKE-ON-TRENT	LONGTON GARAGES, STAFFORD STREET, LONGTON, Tel. No. 3253.
STOURBRIDGE	Richard Taylor (Garages) Ltd., Victoria Street.

STRANRAER	McHarris (Stranraer) Ltd., County Garage.
STRATFORD-ON-AVON	F. Guyver & Sons Ltd., Guild Street.
SUNDERLAND	Binns Ltd., Union Street.
SUTTON, Surrey	Surrey Motors Ltd., High Street.
SWANSEA	MORSMITH MOTORS LTD., CLARENCE TERRACE. Tel. No. 2101.
TADCASTER	Walkers Garage (Tadcaster) Ltd., Westgate.
TAUNTON	C. ALLEN & SONS LTD. Tel. No 2055/6. Hale: & Bryant Ltd., 30131, East Reach.
TONBRIDGE, Sussex	Tonbridge Motor Services Ltd., Speedway House.
TORQUAY	South Devon Garages Ltd., 5, Market Street.
TRING	Wright & Wright.
TRURO	TAYLORS (TRURO) LTD., LEMON QUAY. Tel. No. 2374.
TUNBRIDGE WELLS	CAFFYNS LTD., 88, GROSVENOR ROAD. Tel. No. 1085/6.
TWICKENHAM	Grand Garages (Richmond) Ltd., 383, Richmond Road.
VIRGINIA WATER	Gavin Fairfax Ltd.
WALMER	County Motors, Dover Road.
WALSALL	W. V. Weston, Lichfield Street.
WALTHAM ABBEY	Hazelmere Motor Co. Ltd., Highbridge Street.
WARRINGTON	E. Garland & Son Ltd., Bridge Street.
WATFORD	Harris Mayes & Co., The "Act of Herts" Garage, St. Albans Road.
WELLINGBOROUGH	York, Ward & Rowlatt Ltd., Oxford Street.
WELLINGTON	Vincent Greenhous (Wellington) Ltd., Holyhead Road, Ketley.
WELLS	Gunnings Garages Ltd.
WETHERBY	F. Snape, 62, North Street.
WEYBRIDGE	Woods Garage Ltd., 22, High Street.
WEYMOUTH	Tilleys, Victoria Street.
WEST BROMWICH	Whitehouse & Oldham, Ltd., Lewisham Garage.
WESTON-SUPER-MARE	Jack Pruen Ltd., 37, Oxford Street.
WHITEHAVEN	STOUTS GARAGES LTD., 2, LOWTHER STREET. Tel. No. 243.
WINCHESTER	Reliance Motor Works (Winchester) Ltd., St. Cross Road.
WINSCOMBIE, Som.	Passey & Porter.
WIGAN	H. H. Timberlake Ltd., Library Street.
WISBUCH	W. H. Johnson & Sons Ltd., Church Terrace.
WOKING	L. F. Dove Ltd., Guildford Road.
WOLVERHAMPTON	CHARLES , ATTWOOD & SON LTD., STAFFORD STREET. Tel. No. 20634.
WORCESTER	W. HOLLOWAY & SONS, 26130, SIDBURY, Tel. No. 4050.

**WORKSOP
WORTHING
WREXHAM**

Central Garage (Worksop) Ltd., Victoria Square.
W. Wade, 30, Chapel Road.
Wrexham Motor & Electrical Eng. Co. Ltd., 37-38,
Chester Street.

YEOVIL

MALES GARAGE LTD., HENDFORD GROVE
GARAGE. Tel. No. 68.

YORK

CITY GARAGE CO., BLAKE STREET. Tel. No. 3181.
North Riding Motors Ltd., Clarence Street.

OVERSEAS

ADEN

Mitchell Cotts &- Co. (Middle East) Ltd., 28/86, The Crescent,
STEAMER POINT, Aden.
Telephone: Not to hand.
Cables: Mitcotts.

**AFRICA – BRITISH
EAST**

The Cooper Motor Corporation, Ltd., Private Bag, Jackson Road,
NAIROBI, Kenya, British East Africa.
Telephone: 3813.
Cables: Farmot.
Halls Garage, Ltd., P.O. Box 69, BLANTYRE, Nyasaland, British
East Africa.
Telephone: 21.
Cables: Hallmark.

**AFRICA – BRITISH
WEST**

British West Africa Corporation, Ltd., 57, Marine and P.O. Box 520,
LAGOS, British West Africa.
Telephone: Not to hand.
Cables: Bewac.
The United Africa Co., Ltd., Motor Dept., P.O. Box 306, ACCRA,
Gold Coast, British West Africa.
Telephone: Not to hand.
Cables: Not to hand.

**AFRICA –
PORTUGUESE EAST**

Agencias Modernas Lda., P.O. Box 1066, LOURENCO MARQUES,
Portuguese East Africa.
Telephone: Not to hand.
Cables: Autocar, Beira.

**AFRICA –
PORTUGUESE WEST**

Uniao Comercial De Automoveis Ltda., Caixa Postal No. 1236,
LUANDA, Portuguese West Africa.
Telephone: Not to hand.
Cables: Uniao.

AFRICA – SOUTH

Fisher & Simmons, Ltd., 12 Albert Street, JOHANNESBURG, South
Africa.
Telephone: 33-1126.
Cables: Smallarms.
Maxwell Campbell Pty, Ltd., 199 Smith Street, DURBAN, South
Africa.
Telephone: Not to hand.
Cables: Not to hand.
Robb Motors, Ltd., 102 Strand Street, CAPETOWN, South Africa.
Telephone: 2-1581.
Cables: Robbmotors.

AFRICA – SOUTH WEST	Terry's Motors, Ltd., P.O. Box 784, WINDHOEK, South West Africa. Telephone: 005-0025. Cables: Terry's.
AFRICA – WEST	The Cavalla River Co., Ltd., MONROVIA, Liberia, West Africa. Telephone: Not to hand. Cables: Not to hand.
ALGERIA	Compagnie Algerienne de Tracteurs, Rue Marecau, Maison Carree, ALGIERS, Algeria. Telephone: Not to hand. Cables: Cadet, Algiers.
ARABIA (Saudi)	Mitchell Cotts & Co. (Sharqieh), Ltd., P.O. Box 31, JEDDA, Saudi Arabia. Telephone. Not to hand. Cables: Mitcotts.
ARABIA (Persian Gulf)	Yusuf A. Afghanim, Automobile Engineers, KUWAIT, Arabia. Telephone. Not to hand. Cables: Cat, Kuwait.
ARGENTINA	Alberto Fehling Ltda., S.R.L., Laprida 2150, BUENOS AIRES, Argentina. Telephone: 41-3767. Cables: Afehico.
AUSTRALIA	Annand & Thompson, Breakfast Creek Road, Newstead, N.I., BRISBANE, Queensland, Australia. Telephone: L.1031, L.1032. Cables: Automotive. Champions, Ltd., Currie Street, ADELAIDE, Australia. Telephone: Not to hand. Cables: Champmotor. Faulls. Ltd., A.M.P. Chambers (Fourth Floor), PERTH, Australia. Telephone: B.3560. Cables: Faulls. Grenville Motors, Ltd., 177-185 William Street, SYDNEY, N.S.W., Australia. Telephone: F.A. 7001. Cables: Larkneve. Regent Motors Pty., Ltd., 86-92 Sturt Street MELBOURNE S.C.4, Australia. Telephone: MX.2157, MX.2158. Cables. Regent.
AUSTRIA	O. J. Aulchia, Marxergasse 618 VIENNA 111 Austria. Telephone. Not to hand. Cables: Not to hand.
BARBADOS	Redman & Taylor's Garages, Ltd., Church Street, BRIDGETOWN, Barbados. Telephone: 2335. Cables: Autoreddlor.
BELGIUM	Anciens Ets. Pilette, S.A., 510 Chaussee de Louvain, BRUSSELS, Belgium. Telephone. 34 31 89. Cables: Pilettauto, Brussels.
BERMUDA	Masters, Ltd., Front Street, HAMILTON, Bermuda. Telephone. 1078, 1192-1193. Cables: Mastand.

BOLIVIA	MacDonald & Co., P.O. Box 879, LE PAZ, Bolivia. Telephone: Not to hand. Cables: Not to hand.
BRAZIL	Goodwin Cocozza, Sociedade Anonima, Edificio d'A Noite-Sala 1721, RIO DE JANEIRO, Brazil. Telephone: 23.5850. Cables. Cocozza. Mario Barros Do Amaral, Rua Senador Querioz 163, SAO PAULO, Brazil. Telephone. 6-2825. Cables: Mabara.
BRITISH WEST INDIES	Corea & Co., Ltd., ST. VINCENT, British West Indies. Telephone: Not to hand. Cables: George, St. Vincent, B.W.I.
BURMA	Steel Brothers & Co., Ltd., 622 Merchant Street, RANGOON, Burma. Telephone: South 616 and 591. Cables: Steelautos.
CANADA	Plimley Automobile Co., Ltd., 654 Burrard Street, VANCOUVER, B.C., Canada. Telephone. Pacific 0264. Cables: Plimley. Weir's Motor Sales, Ltd., 1115 Mansfield, MONTREAL, Canada. Telephone: Plateau 4623. Cables: Weirauto. Yorktown Motors, Ltd., 637 Yonge Street, TORONTO, Ontario, Canada. Telephone: Not to hand. Cables: Not to hand.
CANARY ISLES	Hernandez Hermanos Cia., Ltda., Blanco 10, Puerto de la Cruz, TENERIFE, Canary Isles. Telephone: 28 y 103. Cables: Autoelectro.
CEYLON	Colonial Motors, Ltd., Union Place, COLOMBO, Ceylon. Telephone.. 3342/44. Cables: Menco.
CHILE	Importadora Fisk S.A.C. Avenue O'Higgins No. 1464, SANTIAGO, Chile. Telephone: 64581 - Casilla 8036. Cables: Ifsac.
CHINA	Reiss Bradley & Co., Ltd., National City Bank of New York Bldgs., 2 Queen's Road, C, HONG KONG. Telephone: 28006-7. Cables. Jostree.
COLOMBIA	Jaime Duran & Cia., Ltda., Carrera 14+1-16-35, Apartado Aereo 4111, BOGOTA, Colombia, South America. Telephone: Not to hand. Cables: Jaiduran, Bogota.
COSTA RICA	Almacen Electra S.A., Calle S. Avenidas 5 & 8, P.O. Box 730, SAN JOSE, Costa Rica. Telephone: 2334. Cables: Alesa.

CYPRUS	Savvas. J. Demades, P.O., Box No. 4, NICOSIA Cyprus. Telephone. Not to hand. Cables: Samades.
CYRENAICA	Mitchell Cotts & Co. (Middle East), Ltd., 16 Via Semaforo, (P.O. Box 47), BENHAZI, Cyrenaica. Telephone: Not to hand. Cables: Mitcotts.
DENMARK	Skandinavisk Motor Co., A/S, Strandvej 25, COPENHAGEN, Denmark. Telephone. Central 8411. Cables: Semjac.
DIOMNICAN REPUBLIC	Reid & Pelleran C. & A., Apartado 1103, Edificio Copello, CUIDAD TRUJILLO, Republica Dominica. Telephone: Not to hand. Cables: Not to hand.
ECUADOR	B. Aviles Aflaro & Cia., Apartado Postal No. 2760, QUITO, Ecuador. Telephone. Not to hand. Cables: Not to hand.
EGYPT	The Pyramids Trading Co., S.A.E., 10 Sharia Kantaret el Dekka Str., CAIRO, Egypt. Telephone: 58027. P.O. Box 2185. Cables: Pramicot
EIRE	Lincoln & Nolan, Ltd., 57-58 Lower Baggot Street, DUBLIN, C.18, Eire. Telephone: DUBLIN 61943. Cables: Lincolan.
ERITREA	Mitchell Cotts & Co. (Middle East), Ltd., Via F. Martini Nos. 21/23, (P.O. Box 1212), ASMARA, Eritrea. Telephone. Not to hand. Cables: Mitcotts.
ETHIOPIA	Mitchell Cotts & Co., (Middle East) Ltd., (P.O. Box 527), ADDIS ABABA, Ethiopia. Telephone: Not to hand. Cables: Mitcotts.
FIJI ISLANDS	Millers, Ltd., P.O. Box 296, SUVA, Fiji Islands. Telephone: Not to hand. Cables: Millers, Suva.
FINLAND	Oy Soumen Autoeollisuus A.B., Fleningsgatan 27, HELSINGFORS, Finland. Telephone: 70 101. Cables: Autoteollisuus.
FRANCE	Franco Britannic Autos, 25, Rue Paul-Valliant Couturier, Levallois-Perret, PARIS (Seine), France. Telephone: Pereire 31-04, 38-68. Cables. Francobrit-Levallois-Perret.
GIBRALTAR	Motor Industries, Ltd., 21 John Mackintosh Square, GIBRALTAR. Telephone. A.228. Cables: Rover.
GREECE	John Phostiropoulo, 39 Stournara, ATHENS, Greece. Telephone. 28-281. Cables: Jophostir.

GUIANA (BRITISH)	S. Davson & Co., Ltd., 17 Water Street, GEORGETOWN, British Guiana. Telephone: Not to hand. Cables: Not to hand.
HOLLAND	N/V H. Engleberts Automobielhandel, Theresiastraat 145, THE HAGUE, Holland. Telephone: 772085. Cables: Emar.
HONDURAS (BRITISH)	British Honduras Distributors, Ltd., BELIZE, British Honduras. Telephone: Not to hand. Cables: Not to hand.
Hong Kong	(As China.)
ICELAND	Heildverzlunin Hekla Ltd., P.O. Box 512, Hafnarstraeti, 10-12 REYKJAVIK, Iceland. Telephone: 1275-8. Cables: Helka, Reykjavik.
INDIA	Dewars Garage & Engineering Works, 4 Council House Street, CALCUTTA, India. Telephone: City 3226-7. Cables: Jondew.
INDO-CHINA	Landis Bros., 74 Boulevard Charnier, SAIGON, Indo-China. Telephone: Not to hand. Cables: Lambrocant.
INDONESIA	Java Motor Import Corp., N.V., (Hvn. Gutwirth & Zonen N.V.), Kramat 17, DJAKARTA, Indonesia. Telephone: Not to hand. Cables: Not to hand.
IRAN	The Trading Firm Y. Bidar, 68 Avenue Shah Reza, TEHERAN, Iran. Telephone: 84-53. Cables: Bidar.
IRAQ	The Anglo-Iraqi Trading Co., Rashdid Street, BAGHDAD. Telephone: 7741. Cables: Siller.
ISRAEL	Michael Schwartz, P.O.B. 1715, TEL AVIV, Israel. Telephone: 5455. Cables: Dogoor, Tel Aviv.
JAMAICA	H. E. Robinson & Co. (Jamaica), Ltd., 81 Hanover Street, KINGSTON, Jamaica. Telephone: Not to hand. Cables: Harvest.
JAPAN	Japan Engineering Co., Ltd., No. 2 Nihonbashi Muromachi, 2-Chome Chuo-Ku, TOKYO, Japan. Telephone: Not to hand. Cables: Japameng.
LEBANON	Michel Andraos, P.O. Box 447, BEIRUT, Lebanon. Telephone: 67-11. Cables: Micandros.
LIBYA	Mitchell Cotts & Co. (Middle East), Ltd., 3 Piazza d'Italia, (P.O. Box 393), TRIPOLI, Libya. Telephone: Not to hand. Cables: Mitcotts.

MADIERA	Madeira Electra Mecanica, Largo Do Pelourinho 26 A 36, FUNCHAL, Madeira. Telephone: 793. Cables: Mem.
MALAYA	Champion Motors, Lt d., 304 Orchard Road, SINGAPORE, Malaya. Telephone: Not to hand. Cables: Champmotors.
MALTA & GOZO	John N. Cassat & Sons, Ltd., 164/165 Pieta Wharf, PIETA, Malta. Telephone. Central 4178. Cables: Sarcas.
MAURITIUS	H. L. Rouillard, 6 Intendance Street, PORT LOUIS, Mauritius. Telephone. Not to hand. Cables: Rover.
MEXICO	Auto-Repuestos de Mexico S.A., Ignacio Ramirez 20, MEXICO D.F., Mexico. Telephone: 13-70-04. Cables: Hart Studebob.
MOROCCO (SPANISH)	Ste. d'Exploitation du Garage, Vulcain, Boulevard Antee et Rue Washington, TANGIER, Spanish Morocco. Telephone. Urbain 1261. Cables: Garage Vulcain.
NEW GUINEA (BRITISH)	Burns, Philp & Co., Ltd., Port Moresby, PAPUA, New Guinea. Telephone: Not to hand. Cables: Not to hand.
NEW HEBRIDES	Burns, Philp & Co., Ltd., VILA, New Hebrides, South Pacific. Telephone: Not to hand. Cables: Not to hand.
NEW ZEALAND	Broadway Parking & Petrol Station, Ltd., P.O. Box 446, DUNEDIN, New Zealand. Telephone: Sales 10-814. Service 11-198. Cables: Broadpark. Christchurch Car Exchange Ltd., 190 St. Asaph Street, CHRISTCHURCH, New Zealand. Telephone: 31-091. Cables: Not to hand. Khyber Pass Motors, Ltd., 42 Kitchener Street, AUCKLAND C.1, New Zealand. Telephone: 44-663. Cables: Kypan. Wellington Motors, Ltd., 189 Willis Street, WELLINGTON, C.2, New Zealand. Telephone. 52-389. Cables: Not to hand.
NORWAY	Norsk Italiensk Auto A/S., Postboks 610, OSLO, Norway. Telephone: Centralbord 58985. Cables: Fiat. (As India.)
PAKISTAN – EAST PAKISTAN – WEST	Mandviwalla Motor Car Co., 4 Grant Road, P.O. Box 893, KARACHI, Pakistan. Telephone: 2756. Cables: Rosebud.

PARAGUAY	The Agroindustrial Y. Commercial Espinoza, Ltda., S.A., Casilla de Correos No. 651, ASUNCION, Paraguay. Telephone: Not to hand. Cables: Not to hand.
PERSIAN GULF	A. A. ZAYANI & Sons, BAHRAIN, Persian Gulf. Telephone: Not to hand. Cables: Zayani.
PERU	Buchanan International S.A., P.O. Box 96, LIMA, Peru. Telephone: Not to hand. Cables: Not to hand.
PORTUGAL	Soc: Electro-Mecanica de Automoveis, Ltda., Garagem Victoria, Travessa de S. Maniede 3, 5 E 9, LISBON, Portugal. Telephone: 63467. Cables: Victorgar.
REUNION (Island of)	As MAURITIUS.
RHODESIA (North.)	Northern Rhodesia Aviation Services, Ltd., P.O. Box 221, LUSAKA, Northern Rhodesia. Telephone: Not to hand. Cables: Not to hand.
RHODESIA (South)	Puzey & Payne, Kingsway, SALISBURY, Southern Rhodesia. Telephone: 2392. Cables: Dodge.
SIAM	Edgar Bros., BANGKOK, Siam. Telephone: Not to hand. Cables: Edgar.
SOMALILAND (British)	Mitchell Cotts &- Go. (Middle East), Ltd., Street No. 8, BERBERA, British Somaliland. Telephone: Not to hand. Cables: Mitcotts.
SPAIN	Romagosa Y. Cornpania, Valencia 295, BARCELONA, 9, Spain. Telephone: 80181. Cables: Carbauto.
SUDAN (Anglo-Egyptian)	Mitchell Cotts & Co. (Middle East), Ltd., Wingate Avenue, Block 3A West, (P.O. Box 221), KHARTOUM, Sudan. Telephone: Not to hand. Cables.. Mitcotts.
SWEDEN	A. B. A. Wiklund, Styrmansgatan 4, STOCKHOLM 14, Sweden. Telephone: Wiklunds. Cables: Wikmanlund.
SWITZERLAND	Titan A. G., Stauffacherstrasse 45, ZURICH, Switzerland. Telephone: (051) 25 86 33. Cables: Titan.
SYRIA	Automotive & Industrial Equipment Co., Inc., Sultan Salim Street, DAMASCUS, Syria. Telephone: Not to hand. Cables: Not to hand.

TRANSJORDAN	Malhas & Halaby Go., Ltd., P.O. Box 177, AMMAN, Transjordan. Telephone. Not to hand. Cables: Said.
TRINIDAD	C. A. Darmanie & Co., Ltd., 12 Richmond Street, PORT OF SPAIN, Trinidad. Telephone: 7949. Cables: Darmanie.
TUNISIA	Le Moteur, 54 Avenue de Carthage, TUNIS, Tunisia. Telephone: Not to hand. Cables: Somoteur, Tunis.
TURKEY	Matas Trading Corporation, Galata, Tahir Han 13-17, ISTANBUL, Turkey. Telephone. 44996. Cables. Matasan.
URUGUAY	Horacio Torrendell S.A. Cuareum 2052, MONTEVIDEO, Uruguay. Telephone: 26886-23378. Cables: Horatorsa
VENEZUELA	Corporation Venezolana Dei Motor, Apartado de Correo No. 74, CARACAS, Venezuela. Telephone. Not to hand. Cables: Not to hand.
YEMEN	See ARABIA (Saudi).

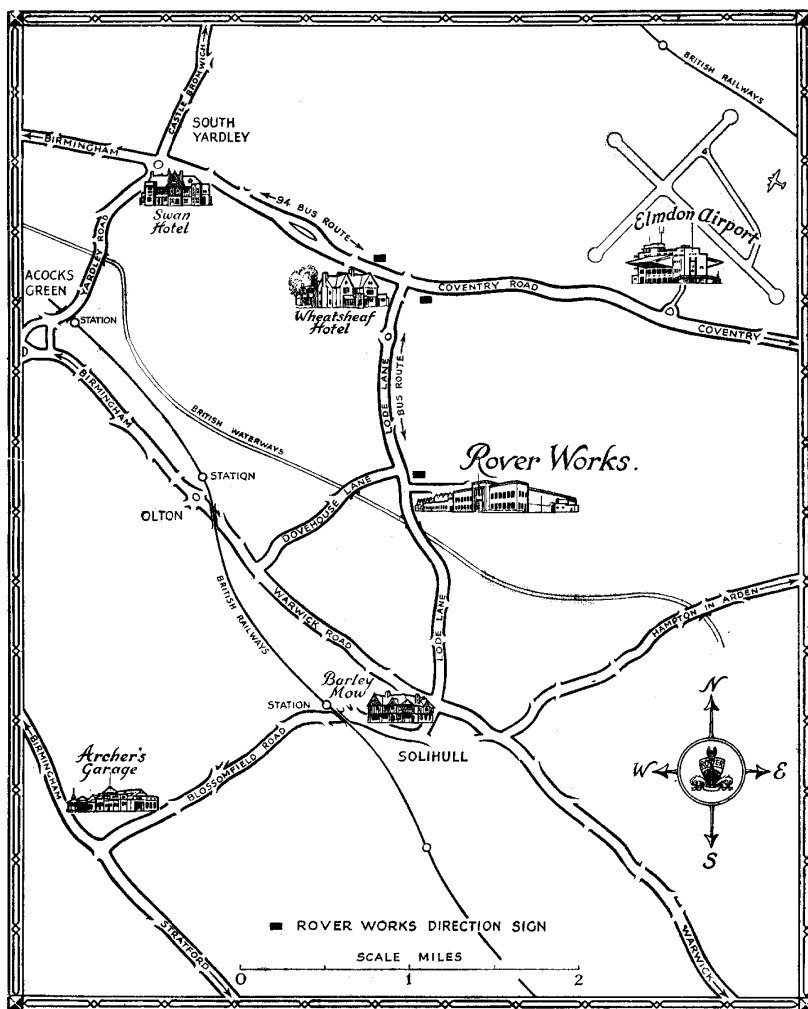


Fig. 58. Map showing location of our Solihull Works

TECHNICAL SERVICE

Instructions are given in this book for items of routine maintenance to which due attention should be paid if smooth and efficient running of your Land-Rover is to be ensured.

In addition, however, there may be times when you desire additional information, either on repair work beyond the scope of this manual or when some difficulty is experienced.

We are always pleased to give such cases our special attention and to reply as fully as possible to any queries you may raise by letter or when you visit either of our Service Depots at Solihull and London. The map on Page 129 should assist you in finding our Solihull factory.

Complete instructions can be supplied for any operation which you may desire to carry out on your Land-Rover.

Should you contemplate taking your Land-Rover overseas, we can give assistance both from the point of view of the location of our dealers throughout the world as well as advice on spare parts, etc.

Please address enquiries under all these headings to:-

THE ROVER CO. LTD.,
TECHNICAL SERVICE DEPT.,
SOLIHULL,
BIRMINGHAM,
ENGLAND.

Telephone: SHELDON 2461.

Telegrams: Rovrepair, Solihull.

