

BRISTOL WORKSHOP MANUAL

TYPE 407 and 408

(UP TO CHASSIS No. 408/7200)

Section 3

General

BRISTOL CARS

FILTON - BRISTOL - ENGLAND

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BRAKES

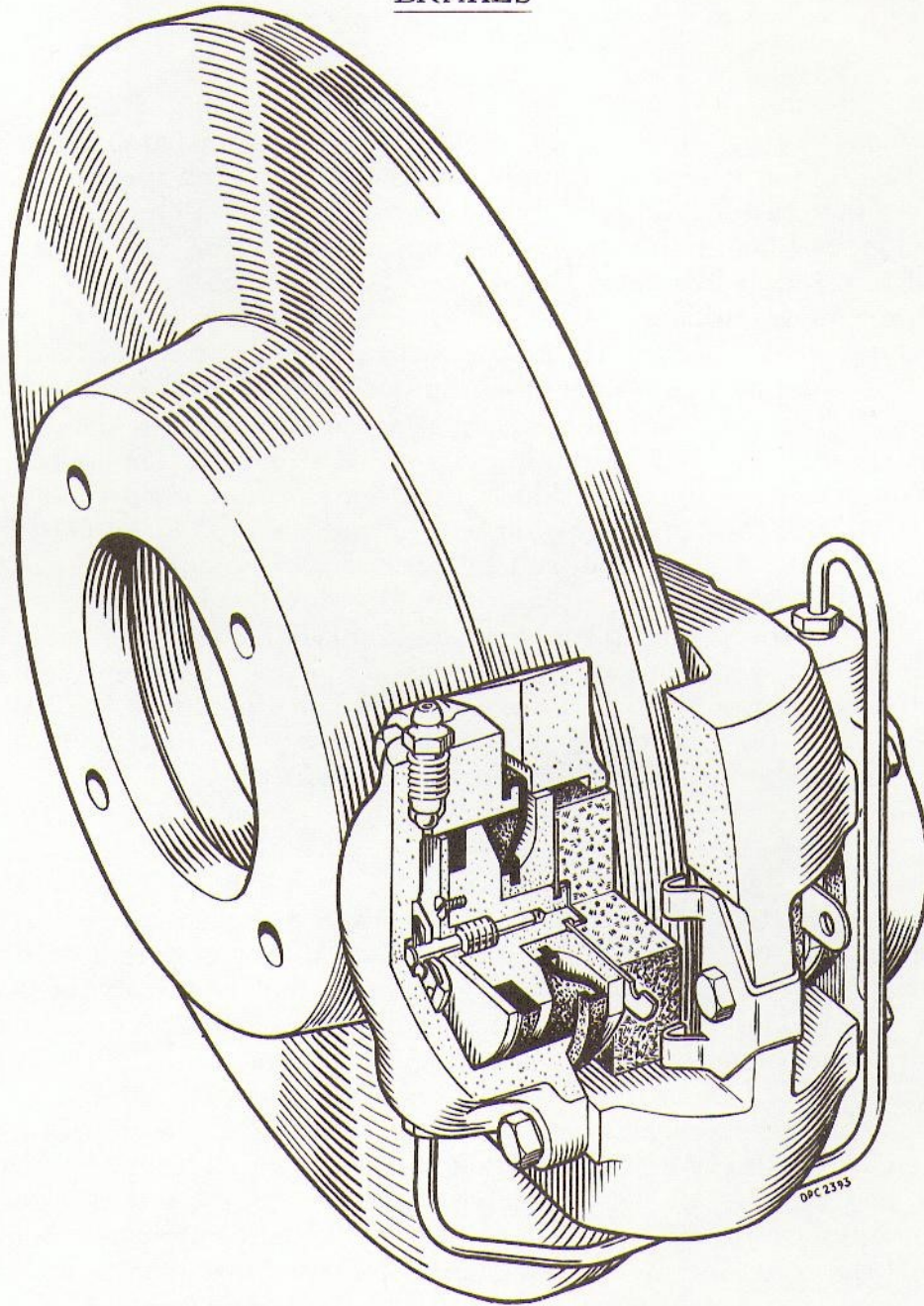


Fig. 1 Sectioned View of Front Disc Brake

The brake system consists of four caliper type disc brakes hydraulically controlled by means of a foot-operated master cylinder and a vacuum servo unit. The front brakes have a larger piston area than the rear, otherwise they differ only in minor details. Separate parking hand brakes mounted on the rear calipers are mechanically operated on the rear discs. In order to maintain the high performance possible with disc brakes it is essential at all times to use only the specified pad material.

DESCRIPTION

Disc Brakes

Each wheel brake unit comprises a hub mounted disc rotating with the wheel, and a braking unit rigidly attached to the suspension member. The brake unit consists of a caliper which straddles the disc and houses a pair of rectangular friction pad assemblies, each comprising a pad and a securing plate. These assemblies locate between a keep plate bolted to the caliper bridge and two support plates accommodated in slots in the caliper jaw. Cylinder blocks bolted to the outer faces of the caliper accommodate piston assemblies which are keyed to the friction pad assemblies. A spigot formed on the outer face of each piston locates in the bore of a backing plate with an integral boss grooved to accommodate the collar of a flexible rubber dust seal. The outer rim of the seal engages a groove around the block face and so protects the assembly from intrusion of moisture and foreign matter. A piston seal is located between the piston inner face and a plate secured by peened locked screws. A counterbore in the piston accommodates a retractor bush which tightly grips the stem of a retractor pin. This pin forms part of an assembly which is peened into the base of the cylinder bore. The assembly comprises a retractor stop bush, two spring washers, a dished cap and the retractor pin; it functions as a return spring and maintains a "brake-off" working clearance of approximately 0.008/0.010 in. between the pads and the disc throughout the life of the pads.

Hand Brake

The mechanically actuated hand brakes are attached to the caliper bodies of the rear brakes by means of hinge bolts. Each brake consists of two carriers which locate astride the brake disc, and riveted to the inner face of each carrier is a friction pad. The inner carrier is equipped with a pivot seat to which is pinned the fork end of an operating lever. A trunnion mounted within the lever fork carries a threaded bolt, the end of which is fitted with a locknut. This bolt passes through the carriers and terminates with a hemispherically formed head which seats in a similarly shaped recess in the outer carrier. Located around the bolt and registering in a counterbore in the inner carrier is an operating lever return spring retained under load by a nut. A spring plate secured to the inner face of the carrier by screws and Shakeproof washers locks the nut in position.

INSTALLATION

Disc Brakes

The assembly of the disc brake to the car should be carried out as follows:-

- (1) Secure the disc to the hub with the bolts, spring washers and nuts provided.

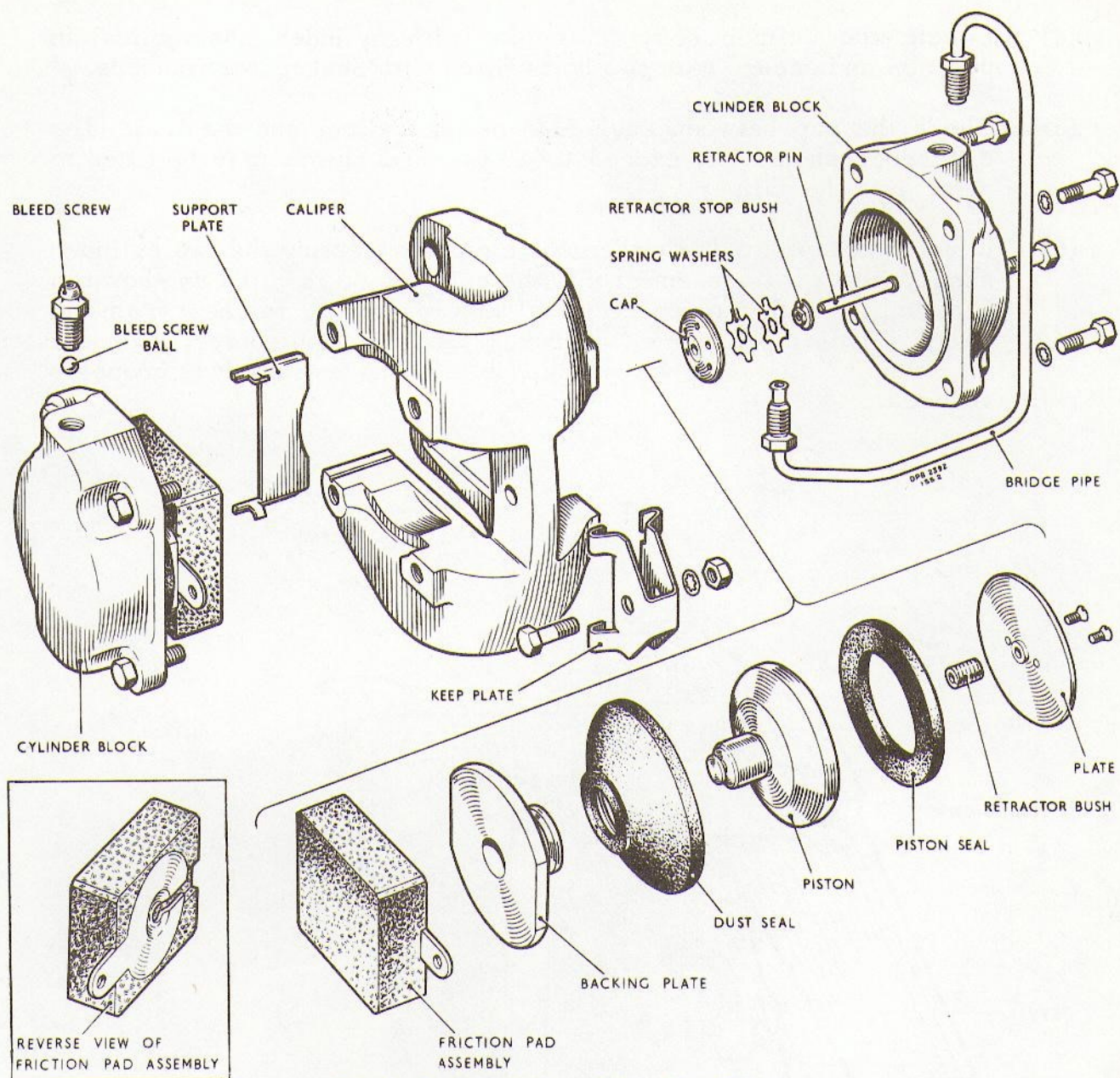


Fig. 2 Exploded View of Front Disc Brake

- (2) Fit the hub to the stub axle or halfshaft as applicable and adjust according to the makers instructions.
- (3) Check the disc for true rotation by clamping a dial test indicator to the chassis so that the needle pad bears on the face of the disc. "Run-out" should not exceed 0.006 in. gauge reading. Manufacturing tolerances on the disc and hub should maintain this truth and in the event of "run-out" exceeding this value the components should be examined for damage.

- (4) Locate the caliper body (complete with cylinder assemblies) in position and secure with two bolts fitted with Shakeproof washers.
- (5) Check the gap between each side of the caliper and the disc. The difference should not exceed 0.010 in., and shims may be fitted to centralise the caliper.
- (6) If not already fitted, fit the bridge pipe connecting the two cylinder assemblies. It is essential that the bridge pipe is fitted as shown in Fig.19; i.e. with the near vertical part of the pipe furthest from the wheel. This pipe carries a rubber identification sleeve. Connect the supply pipe to the cylinder block and ensure it is properly secured.

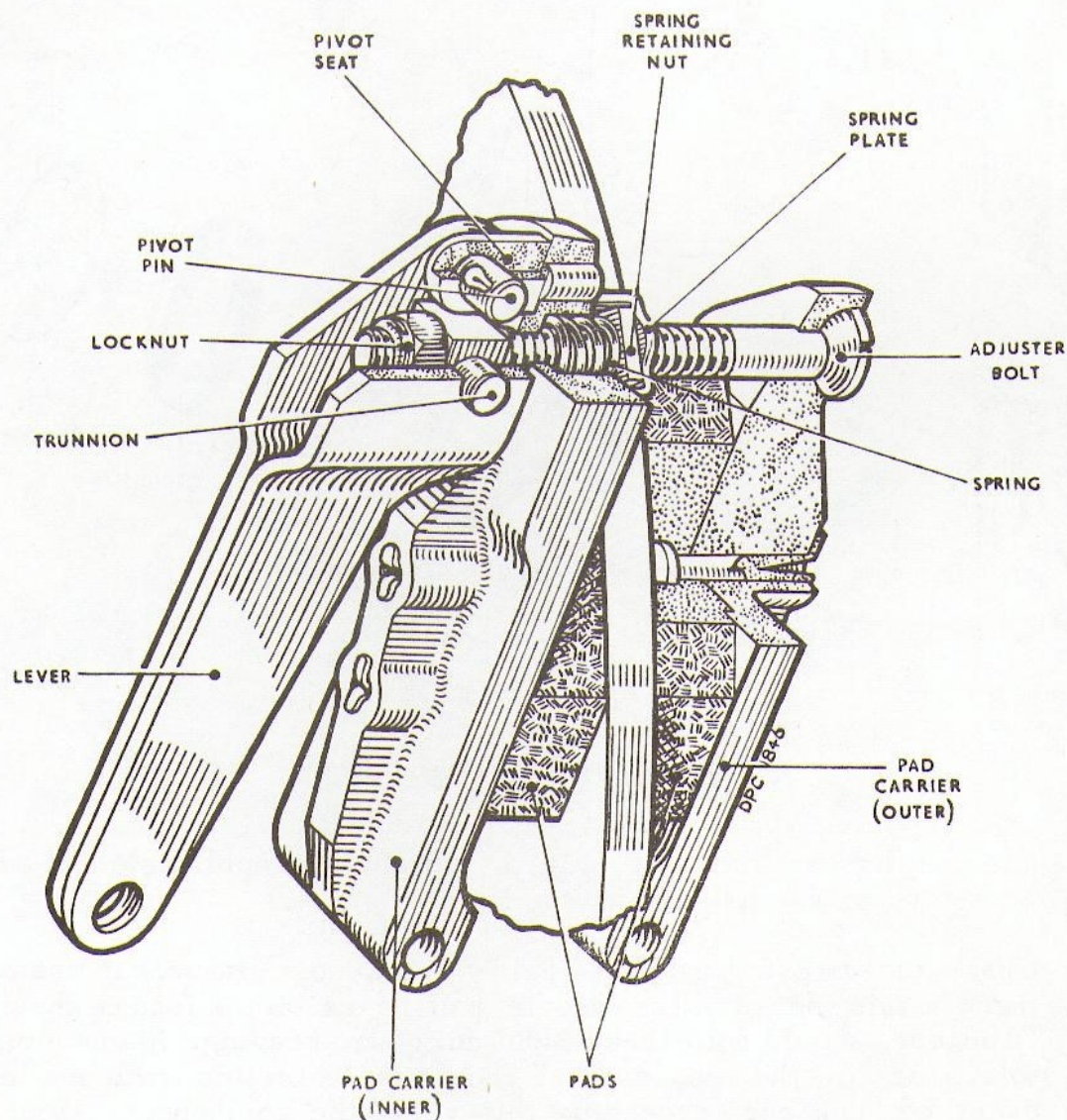


Fig. 3 Sectioned View of Hand Brake

Hand Brake

Slacken the carrier adjuster bolt, position the carrier in the rear caliper and secure them with the bolts and lockwashers. Set the brake clearance by tightening the adjuster bolt until the pads are lightly in contact with the disc and then slacken the bolt $1/3$ turn. This clearance should be reset when the travel of the hand brake lever becomes excessive.

Handbrake Lever

Handbrake travel, fully-on to fully-off, 4 to 5 teeth on ratchet. To adjust travel, set handbrake lever fully-off. With road wheel free to rotate by hand, insert screwdriver through any hole in wheel opposite to handbrake-pad adjusting screw and tighten screw sufficiently to prevent wheel from turning then slacken back one-third of a turn, allowing wheel to be rotated by hand.

Foot-Brake Pedal and Master Cylinder

Master cylinder is Lockheed manufacture but is modified and it is important to note that replacements must be obtained from the car manufacturers.

A brake-fluid level switch is fitted to the master cylinder fluid reservoir and is wired to a fluid-level-warning light fitted to the dashboard.

Brake-pedal positioning is important. To achieve an approximate distance of $6\frac{1}{2}$ in. from the carpet on the scuttle to the centre line of the pedal pad, the distance from the spherical end of the push-rod to the hole in the fork-end should be maintained at 6 in. The return stop should then be set to give $1/32$ in. free-travel.

Priming and Bleeding the Brake System

The following procedure should be adopted either for initial priming of the system, or to bleed in service if air has been permitted to enter the system. This latter condition may occur if connections are not maintained properly tightened, or if the master cylinder periodic fluid level check is neglected. During the bleeding operation it is important that the level in the reservoir is kept topped up to avoid drawing air into the system. It is recommended that new fluid be used for this purpose but when this is not possible the original fluid may be returned to the reservoir, providing it is clean and free from air.

- (1) Check that all connections are tightened and all bleed screws closed.
- (2) Fill the reservoir with brake fluid of the correct specification.
- (3) Attach the bleeder tube to the bleed screw on the near side rear brake and immerse the open end of the tube in a small quantity of brake

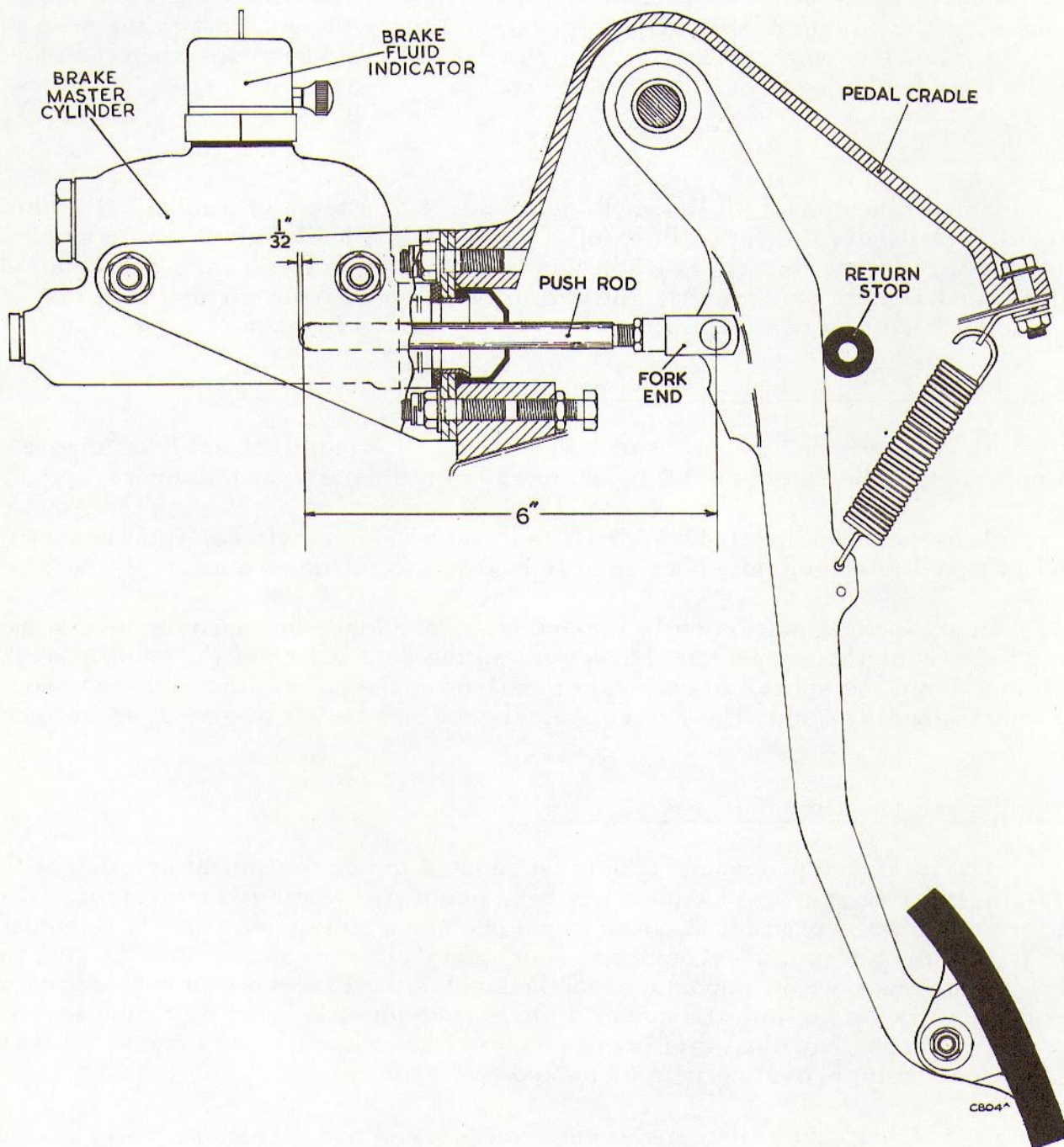


Fig. 4 Brake Pedal Unit

fluid contained in a clean glass jar. Slacken the bleed screw and operate the brake pedal slowly backwards and forwards through its full stroke until fluid pumped into the jar is reasonably free from air bubbles. Keep the pedal depressed and close the bleed screw. Release the pedal.

- (4) Repeat for each brake in turn.
- (5) Repeat the complete bleeding sequence until the brake fluid pumped into the jar is completely free from air bubbles.
- (6) Lock all bleed screws and finally regulate the fluid level in the reservoir.
- (7) Apply normal working load on the brake pedal for a period of two or three minutes and examine the entire system for leaks.

Servicing

General

The complete brake system is designed to require the minimum of attention and providing the hydraulic fluid in the reservoir is not allowed to fall below the recommended level no defects should normally occur. Fluid loss must be supplemented by periodically topping up the reservoir with fluid of the same specifications of that in the system. When alternative approved fluids are specified, the complete system must be drained before the substitution of one fluid for another. It is not permissible to top up the reservoir with an alternative approved brand of fluid.

The inclusion of air in a system of this type will be indicated by sluggish response of the brakes and spongy action the brake pedal. This condition may be due to air induction at a loose joint or at a reservoir in which the fluid has been allowed to fall to a very low level. These defects must be immediately remedied and the complete system bled. Similarly, bleeding the system is equally essential following any servicing operation involving the disconnecting of part or whole of the hydraulic system.

The following instructions detail the procedure for renewal of component parts and for complete overhaul of the disc brakes, hand brakes and master cylinder. The units should be thoroughly cleaned externally before dismantling. Brake system fluid should be used for cleaning internal components, and, except where otherwise stated in these notes, the use of petrol, paraffin or chemical grease solvents should be avoided as they may be detrimental to the rubber components. Throughout the dismantling and assembling operation it is essential that the work bench be maintained in a clean condition and that the components are not handled with dirty or greasy hands. The precision parts should be handled with extreme care and should be carefully placed away from tools or other equipment likely to cause damage. After cleaning all components should be dried with clean lint-free rag.

When it is not the intention to renew the rubber components they must be carefully examined for serviceability. There must be no evidence of defects such as perishing excessive swelling, cutting or twisting and where doubt exists comparison with new parts may prove to be of some assistance in making an assessment of their condition. The flexible pipes must show no signs of deterioration or damage and the bores should be cleaned with a jet of compressed air. No attempt should be made to clear blockage by probing as this may result in damage to the lining and serious restriction to fluid flow. Partially or totally blocked flexible pipes must always be renewed. When removing or re-fitting a flexible pipe to end sleeve hexagon must be held with the appropriate spanner to prevent the pipe from twisting. A twisted pipe will prove detrimental to efficient brake operation.

Renewing the Friction Pads

Brake adjustment is automatic during the wearing life of the pads. The pads should be checked for wear at frequent intervals by visual observation and measurement; when wear has reduced the pads to the minimum permissible thickness of 0.250 in., the pad assemblies (complete with securing plates) must be renewed. If checking is neglected the need to renew the pads will be indicated by a loss of brake efficiency. The friction pads fitted have been selected as a result of intensive development. In order to maintain the high performance possible it is essential at all times to use only the specified pad material. To fit new friction pad assemblies as follows:-

- (1) Remove the nut, washer and bolt securing the keep plate and withdraw the plate.
- (2) With a suitable hooked implement engaged in the hole in the lug of the securing plate withdraw the defective pad assemblies.
- (3) Thoroughly clean, the backing plate, dust seal, and the surrounding area of the caliper.
- (4) With the aid of the special tool (refer to the relevant Data Sheet) press in the piston assemblies to the base of the cylinder bores, as described in the following instruction (5).
- (5) Insert the forked end of the piston re-setting lever (refer to Fig.5) into the space between the caliper bridge and one of the piston backing plates, with the fork astride the projecting piston spigot and its convex face bearing on the piston backing plate. Locate the spigot end of the lever pin in the keep plate bolt hole in the bridge. Pivot the lever about the pin to force the piston to the base of its cylinder. Insert the new friction pad assembly. Repeat this operation for the opposite piston assembly.
- (6) Replace the keep plate and secure it with the bolt, washer and nut.

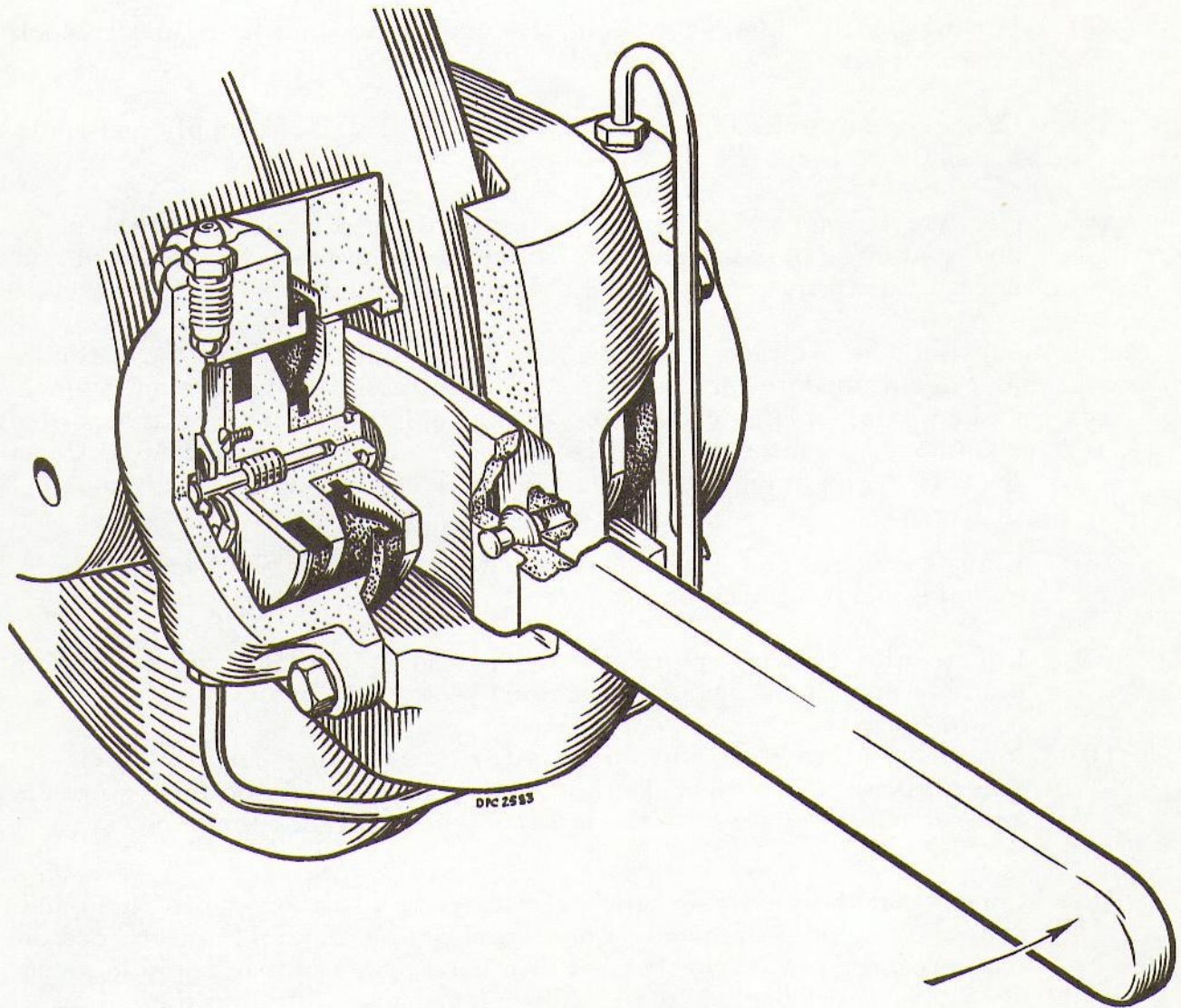


Fig. 5 Resetting the Pistons

Renewing the Brake Piston Seals

Leakage past the piston seals will be denoted by a fall in level in the fluid reservoir or by a spongy pedal travel. It is recommended that the dust seal be renewed when fitting a new piston seal. Proceed as follows:-

- (1) Withdraw the brake pads as described.
- (2) Disconnect and blank off the supply pipe and remove the bridge pipe.
- (3) Remove the mounting bolts securing the cylinder blocks to the caliper and withdraw the cylinder blocks. Thoroughly clean the blocks externally before proceeding with further dismantling.

- (4) Disengage the dust seal from the groove around the cylinder block face.
- (5) Connect the cylinder block to a source of fluid supply and apply pressure to eject the piston assembly.
- (6) Remove the screws securing the plate to the piston, lift off the plate and piston seal, withdraw the retractor bush from within the piston bore. Carefully cut away and discard the dust seal.
- (7) Support the backing plate on a bush of sufficient bore diameter to just accommodate the piston. With a suitable tubular distance piece placed against the end of the piston spigot and located around the shouldered head, press out the piston from the backing plate. Care must be taken during this operation to avoid damaging the piston.
- (8) Engage the collar of a new dust seal with the lip on the backing plate, avoiding harmful stretching.
- (9) Locate the backing plate on the piston spigot and with the piston suitably supported press the backing plate fully home.
- (10) Insert the retractor bush into the bore of the piston. Lightly lubricate a new piston seal with brake fluid, and fit it to the piston face. Attach and secure the plate with the screws, and then lock the screws.
- (11) Check that the piston and the cylinder bore are thoroughly clean and show no signs of damage. Locate the piston assembly on the end of the retractor pin. With the aid of a hand press slowly apply an even pressure to the backing plate and press the assembly into the cylinder bore. During this operation ensure the piston assembly is in correct alignment in relation to the cylinder bore, and that the piston seal does not become twisted or trapped as it enters. Engage the outer rim of the dust seal in the groove around the cylinder block face. Ensure that the two support plates are in position.
- (12) Re-assemble the cylinder blocks to the caliper. Fit the bridge pipes, ensuring that they are correctly positioned. Remove the blank and reconnect the supply pipe.
- (13) Fit the pad assemblies and the keep plate. Prime and bleed the system as described.

Re-lining the Hand Brake

The recommended procedure for renewing the friction pads is as follows:-

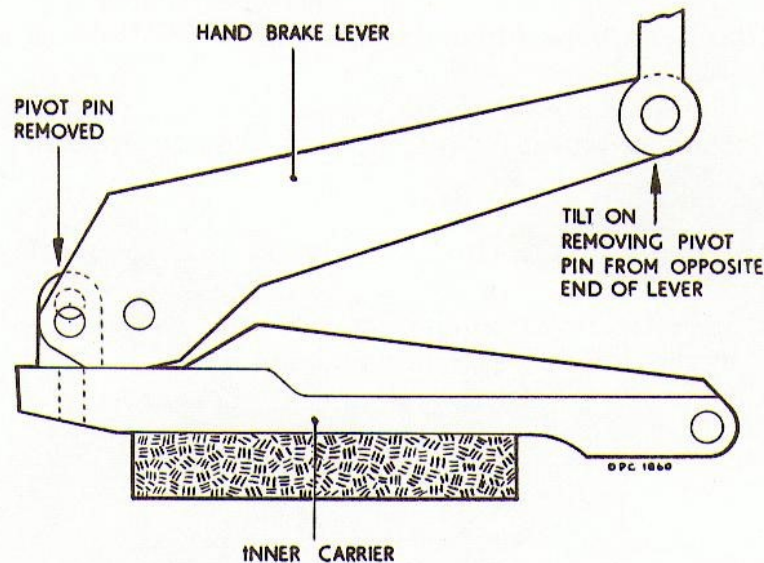


Fig. 6 Re-Fitting the Hand Brake Lever

- (1) Unscrew and remove the adjuster bolt and locknut and swing the pad carriers away from the disc.
- (2) Remove a split pin and withdraw the lever pivot pin. (See Fig.6).
- (3) Remove the bifurcated rivets from both carriers and prise off the worn linings.
- (4) Place the new linings in position and secure them with new bifurcated rivets.
- (5) Place the lever against the inner carrier in the attitude shown in Fig.6. Hold the locknut firmly against the outer face of the trunnion and screw in the adjuster bolt until three or four threads engage the locknut.
- (6) Align the holes in the lever and pivot seat, fit the pivot pin and lock it with the split pin.
- (7) Reset the clearance as previously described.

Hand Brake System Adjustment

The following method should be adopted to adjust the hand brake operating system. This procedure is applicable on initial installation and after renewal of components or adjustment due to cable stretch or wear in the linkage.

- (1) Tighten each hand brake adjuster bolt until the pads "nip" tightly on the discs.

- (2) Place the hand brake lever in the fully "OFF" position.
- (3) Adjust the hand brake cable in accordance with the manufacturer's instructions, ensuring that there is no pre-load or slackness in the linkage.
- (4) Adjust the hand brakes individually as previously described.

Note: Adjustment to compensate for pad wear should always be made at the hand brake unit and at no other adjustment point in the system.

PROPELLOR SHAFT

Type and make of Joints

Detroit Universal.

This unit should be serviced every 10,000 miles. From beneath the car it should be completely removed by taking out the bolts at the front end and releasing the clamp caps at the rear end.

At the forward end of the shaft remove the cover and gasket by bending back the tabs. The amount of grease this joint should contain is 2 ozs. spread evenly throughout the working surfaces. Do not overfill.

At the rear end release the roller and bushing assemblies, freely grease them and re-assemble.

FRONT SUSPENSION

TOE-IN	1/8 inch
CAMBER ANGLE	0°
CASTOR ANGLE	1° NOMINAL

The front suspension is independent with coil springs and telescopic shock absorbers as shown in Fig.1. (C.806).

A torsional anti-roll bar is fitted.

Inner wishbone joints are rubber mounted while the outer are nylon lined ball joints.

<u>Torque Reference</u>	<u>Foot Pounds</u>
Lower Taper Joint Nuts - Stub Axle Carrier	45 (then to next castellation)
Upper Taper Joint Nuts - Stub Axle Carrier	40 (then to next castellation)
Wishbone to Lower Suspension Joint Nuts	44
Wishbone to Upper Suspension Joint Nuts	30
Lower Wishbone Pivot Nuts	60
Upper Wishbone Pivot Nuts	45
Spring Seat to Lower Wishbone Nuts	25
Stub Axle to Stub Axle Carrier Nuts	100
Steering Arm to Stub Axle Carrier Nuts	28
Brake Adaptor Plate to Stub Axle Carrier Nuts	30
Drop Arm to Steering Box and Idler Nuts	100
Brake Caliper Attachment Bolts	36 to 53
Brake Disc Attachment Bolt	35

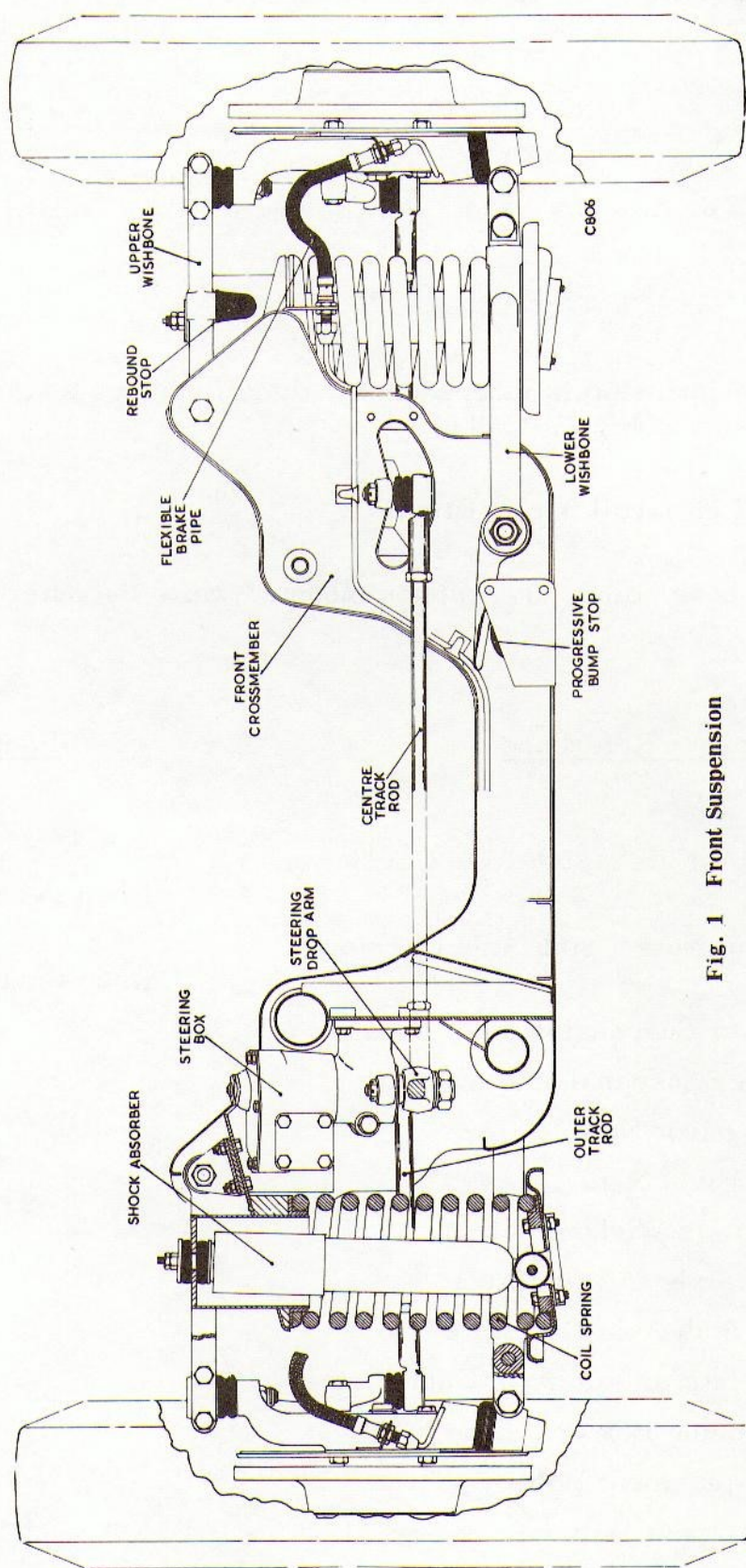


Fig. 1 Front Suspension

Hub and Stub Axle Assembly

Front Wheel hubs are mounted on two taper roller bearings with an oil seal on the inside of the rear bearing as shown in Fig.2 (C.802). At approved intervals, every 20,000 miles or 2 years whichever is sooner, as given in the car instruction book, the hub should be completely removed and grease packed between the bearings. The hexagon dust cap should not contain, or be loaded, with any grease.

Brake disc run-out, measured $\frac{1}{4}$ inch from outside diameter of disc should not exceed .006 inch. The hub should have an end float of .001 to .003 inch which is achieved by lightly tightening the stub axle nut, with the hub spinning, then slackening to give the correct end float (using a dial indicator) before inserting the split pin.

Brake discs and brake pads should have an equal clearance within .010 inch of each other which is controlled by the use of shims between the caliper unit and the adaptor plate bolting face.

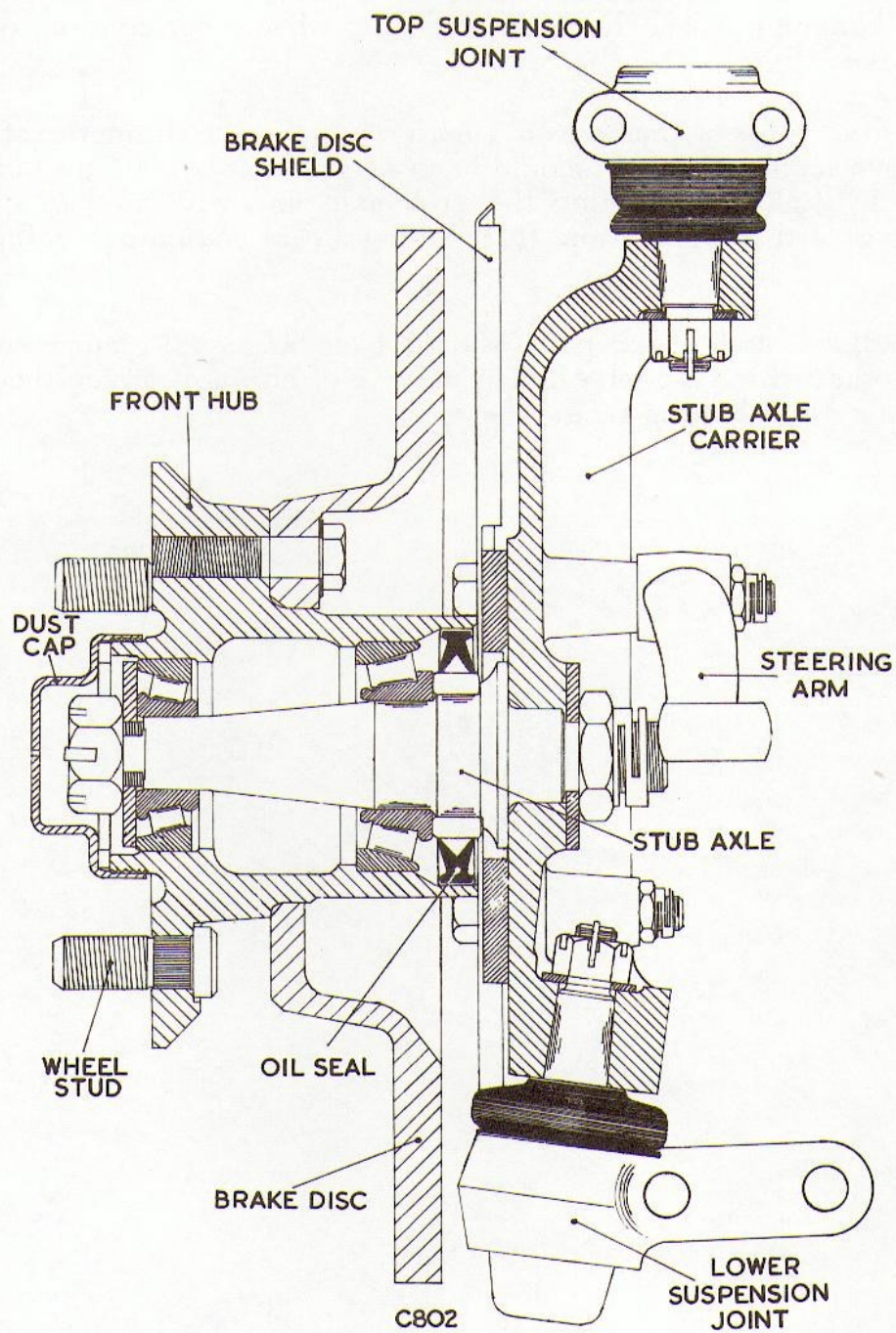


Fig. 2 Front Hub and Stub Axle

STEERING

ALIGNMENT DATA TABLE

WHEEL BASE	...	...	...	...	...	...	...	...	...	...	...	...	...	114 inch
FRONT TRACK	...	...	...	...	...	...	...	...	...	...	...	...	...	53 inch
REAR TRACK	...	...	...	...	...	...	...	...	...	...	...	...	...	54½ inch

A Marles worm type steering box is fitted and is connected to the steering column by a universal joint as shown in Fig.3 (R214). The track rods as shown in Fig.1 (C.806) are fitted with nylon lined ball joints and the ends have screwed adjustments.

The steering wheel has a circular locking ring incorporated and a limited adjustment controlled by circlips, can be made by using a ring spanner.

Steering Box

It is important to note that the Marles steering box and the steering clamp are considered an integral unit and they should not be separated. The clamping bolt and nut have had the hexagon removed to prevent separation.

If it is necessary to take up endplay in the steering box, loosen the locknut on the back of the cover plate, adjust the screw until all end float is eliminated and tighten the locknut.

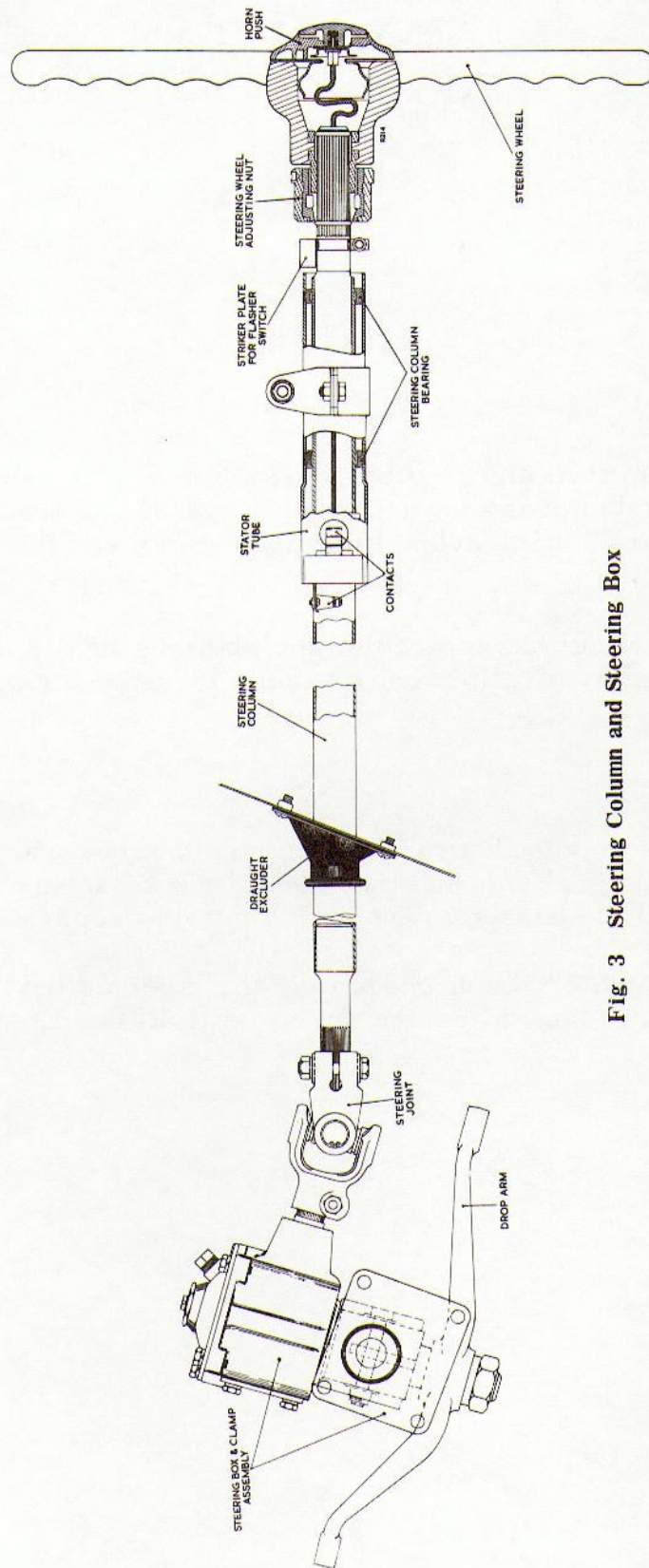


Fig. 3 Steering Column and Steering Box

Rear Axle and Rear Suspension

The rear axle as shown in Fig.4R.189 is the Salisbury Axle type 4 HA with a ratio of 3.31 to 1 and the suspension arms are rubber mounted as shown in Fig.5 R.213.

Alignment of the rear axle, for tracking purposes can be carried out by releasing the three screws on the rear axle, at the immediate rear of the suspension arms and revolving the bush until the correct alignment is obtained.

If the suspension arms are dismantled or the taper rubber bushes replaced, they should not be tightened until the car is on its wheels, otherwise they will be unduly loaded.

It is essential to note that an anti-friction washer is fitted by Bristol Cars between the companion flange face and the oil stinger of the Salisbury axle. This is to eliminate a "pinging" noise on drive take-up and during gear changes.

REAR SHOCK ABSORBERS

Type 407... .. Armstrong Telescopic

Type 408... .. Armstrong Telescopic - Selectaride

Armstrong selectaride electrically controlled absorbers are fitted to the rear suspension and are operated by the switch on the dashboard.

This switch must be turned clock-wise only, as indicated by the arrows on the bezel between the stations.

The 'SOFT' station is recommended for leisurely cruising while high speeds could demand the firm suspension provided for by Station 4. Intermediate degrees of damping are provided for by Stations 2 and 3. If by an chance it is desired to go from a 'SOFT' ride to a firm ride (4) then the switch must be turned through the intermediate stations, as indicated by the arrows, in order to reach it. The Switch must not be turned back (anti-clockwise).

NOTE: If the Selectaride switch is moved with the ignition off, turn the switch through one full revolution with the ignition on before selecting the desired setting. When operating the switch do not hold the pointer in a position between the marked stations into which it indexes.

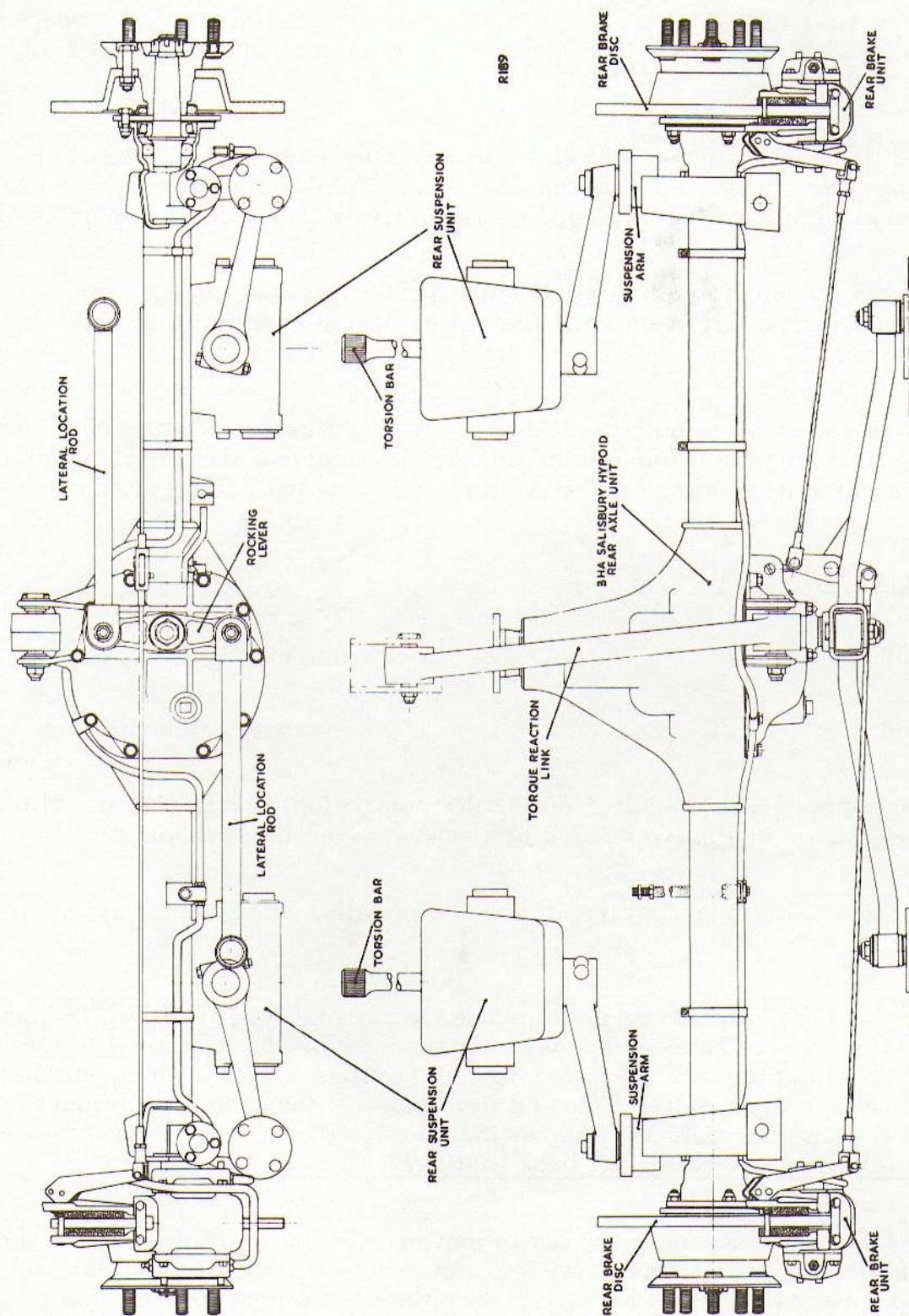


Fig. 4 Arrangement of Rear Suspension

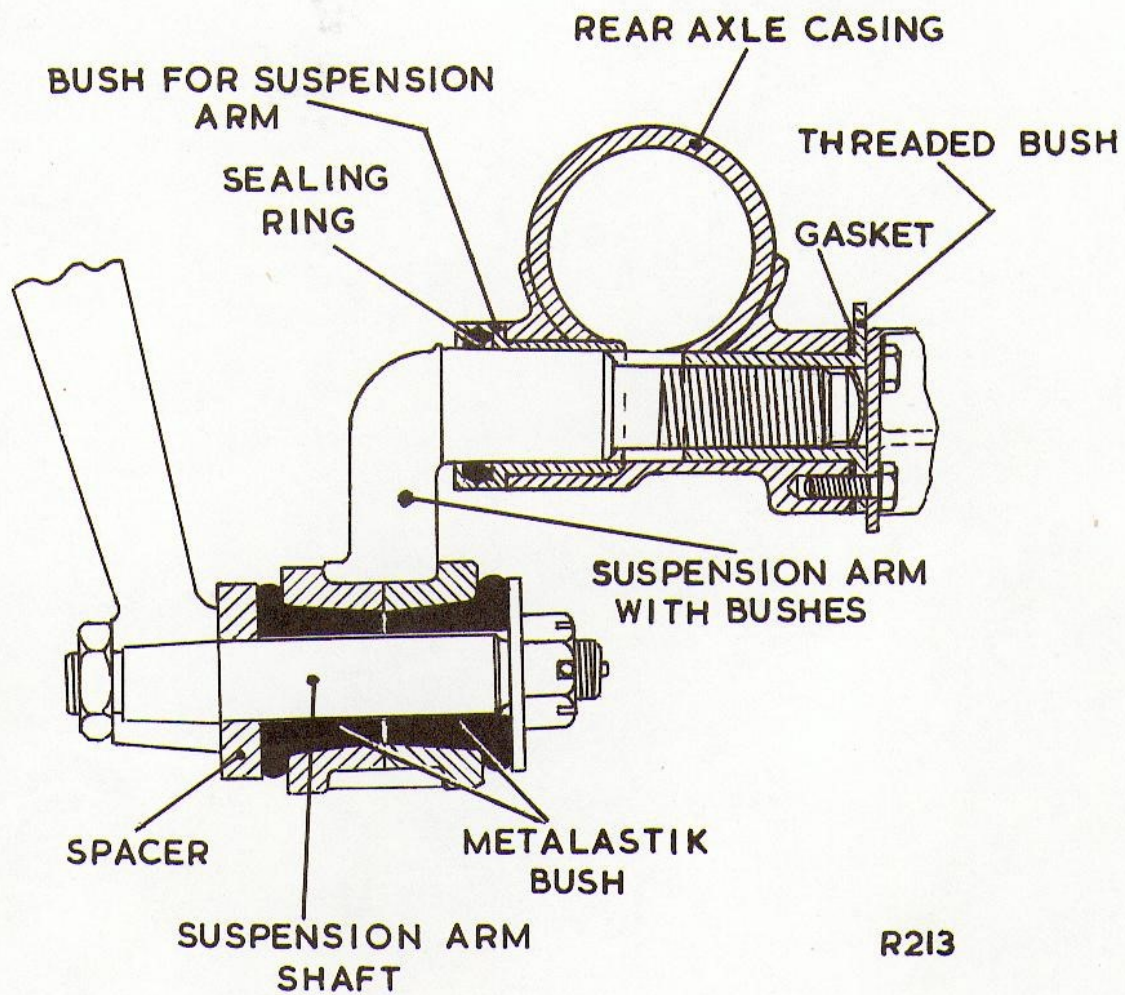


Fig.5 Rear Suspension Arm

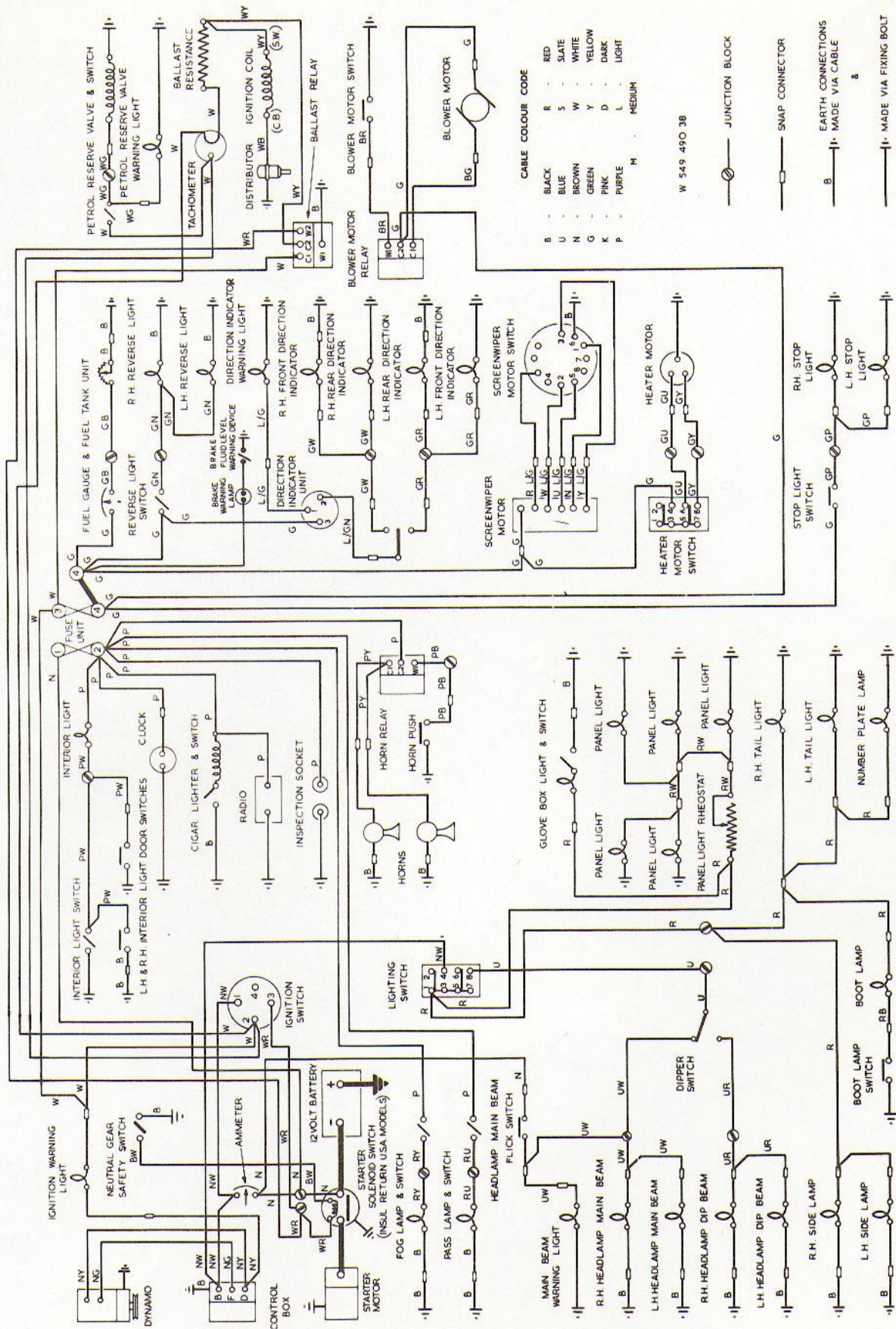


Fig. 6 Wiring Diagram

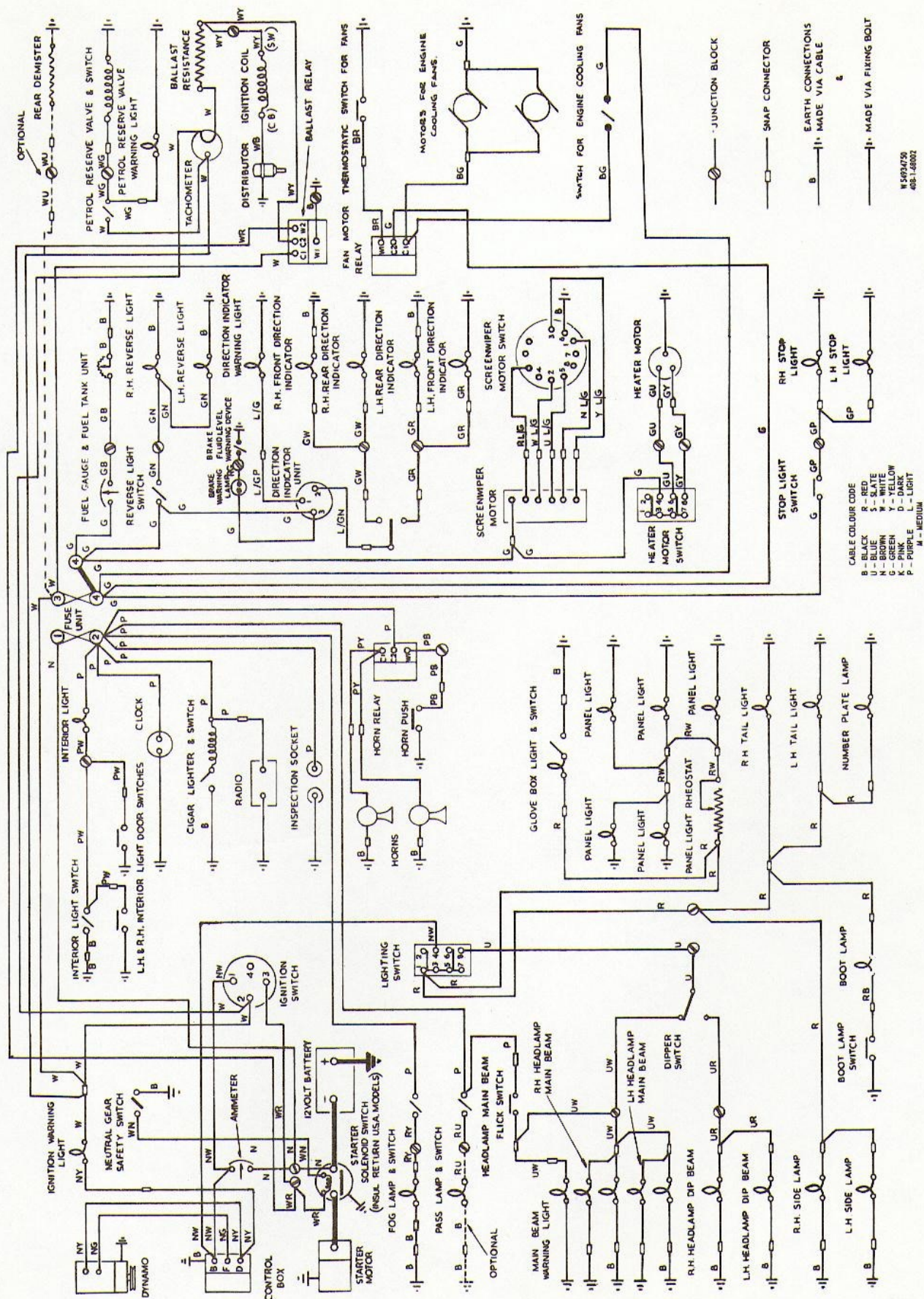


Fig. 7 Wiring Diagram

ELECTRICAL SYSTEM - Type 407

This is a Lucas 12 volt system. Current is supplied by a large capacity air cooled generator in conjunction with a voltage and current regulator with automatic cut-out and a 12 volt 72 ampere battery.

BATTERY, Lucas BT.11A 4016437

The battery is housed in the offside wing bay.

Always keep the top of the battery clean and dry. 'Topping up' the battery is a routine matter and means that the plates in the battery should always be just covered by adding distilled water to the cells by removing the filler plugs. Various commercial appliances and methods are used for this procedure, but it is important not to overfill. Never use a naked light to examine the levels as the gas given out is inflammable.

No particular period can be given for the 'topping up' of the battery as hot weather and the conditions of use of the car must be taken into consideration. It is better to examine the levels frequently.

See that the battery is level and firmly clamped into position. The positive and negative connections are of different sizes and it is not normally possible to incorrectly attach them. Keep the battery connections clean, and smear the terminals with vaseline or petroleum jelly before attaching the leads, to prevent corrosion.

Trickle Charger Socket

An electric supply/feed socket is mounted on the right hand valance, in the engine bay, beneath the bonnet. Since it is direct electrical contact with the battery, current may be drawn from the battery or supplied to it from a trickle charger.

The object of the trickle charger is to maintain the battery in a fully charged state when the car is not in use for lengthy periods, or when the output from the battery is too great for the running time to permit a fully maintained charge (e.g. short runs in winter months using lamps, starter etc.).

GENERATOR BRUSHES

Brushes should be examined at 10,000 miles, again at 20,000 miles, and at 5,000 miles thereafter.

Brushes that are worn short, or are covered with oil, should be replaced to prevent damage to armature, commutator and windings.

VOLTAGE AND CURRENT REGULATOR - Chrysler 1889944.

FUSE BOX - LUCAS MODEL 4FJ. PART No. 033283L.

The voltage/current regulator and cut-out are housed in the right hand wing bay.

Two fuses are contained in the fuse block positioned immediately below the regulator. The positions of the fuses are clearly marked A1.A2. (Auxiliary fuse) and A3.A4 (Auxiliary ignition) and they protect certain accessories as follows:-

	Independent of the ignition switch	Controlled by the ignition switch
	Head, Side, Tail, Boot and Number Plate Lamp. Headlamp Warning Light. Panel Lights. Ammeter. Horns. Radio. Clock.	Ignition and Ignition Warning Light. Petrol Reserve Warning Light and all Accessories connected to A3,A4 Fuse.
Protected by A1,A2 Fuse 35 Amp.	Trickle Charger Socket. Fog Lamp. Spot Lamp. Cigar Lighter. Interior Light. Horns. Radio. Clock.	
Protected by A3,A4 Fuse 35 Amp.		Stop Lamp. Petrol Gauge. Flasher Indicators. Flasher Warning Light. Blower Unit. Reverse Lamp. Petrol Reserve Warning Light. Windscreen Wiper Motor. Brake Fluid Level Warning Light.

All accessories protected by a fuse will be inoperative if that fuse is blown.

CAUTION: Never replace a blown fuse with one of higher value, as this will only result in damage to accessories if a short circuit occurs.

The voltage/current regulator controls the output of the generator according to the load on the battery and its state of charge. When the battery is in a low state of charge the generator output is high, and this is shown on the ammeter.

WINDSCREEN WIPERS

WIPER ARM - Lucas Part No. 54711438

WIPER BLADE - Lucas Part No. 54711283

The windscreen wiper motor is mounted in the right hand wing bay. The cable transmits motion to the two wheel-boxes beneath the windscreen, which operate the wiper arms and blades.

No adjustment or lubrication is normally necessary as all parts are packed with lubricant on assembly.

The windscreen wiper control knob, marked WIPER, on the dashboard has three operating positions.

A thermostatic cut-out switch is built into the wiper motor to prevent overheating. However, in order to avoid excessive load, the fast speed should only be used in heavy rain. Never use it in snow or on a drying windscreen without the use of the screenwash.

HORNS

High Note	...	...	...	...	...	Lucas WT.618	Part No. 69090
Low Note	...	...	...	...	...	Lucas WT.618	Part No. 69087

Dual Windtone horns are fitted beneath the bonnet on each side of the engine valance.

The push button in the centre of the steering wheel operates a solenoid relay switch Lucas 6.RA. Part No. 33188A situated in the vicinity of the right hand horn.

The horns should give a long period of service without attention, but should they become unsatisfactory, check for any loose connections or loose attachment bolts before rejecting the horn itself.

LAMPS

Headlamps

Home Lucas Model F.700 MK.X. Part No. 58618.
Light Unit (Home) Lucas 7002 60/45W.

This is a sealed beam unit and in the event of a bulb failure the complete light unit must be changed. A high beam warning light - RED - is incorporated into the speedometer. When the foot operated headlamp DIPPER SWITCH,

is depressed, it alternatively switches the headlamp bulb from the lower power filament to the higher power filament, at which stage the RED headlamp warning light is ON. In the dipped position the light is OUT.

Fog Lamp	Lucas Model SFT.576. Part No.55128. Lucas Bulb No.600 (Yellow) 12v.48w.
Spot Lamp	Lucas Model SLR.576. Part No.55132. Lucas Bulb No.185 12v. 48w.
Front Side Lamp and Flasher (Clear)	Lucas Model L539. Part No.52333. Lucas Bulb No.380 12v. Twin Filament 21/6w.
Rear Side, Stop and combined Reflector Lamp (RED)	Lucas Model L551. Part No.53377A. Lucas Bulb No.380 12v. Twin Filament 21/6w.
Rear Flasher Lamp (Amber)	Lucas Model L539. Part No.52272. Lucas Bulb 382 12v. 21w.
Reverse Lamp	Lucas Model L.488. Part No.52246B. Lucas Bulb No.382. 12v. 21w.
Rear Number Plate Lamp.	Lucas Model L.534. Part No.53518. Osram Bulb. 12v. 4w.

Instrument Panel Illumination

The instruments are illuminated as follows:- one bulb in the speedometer, one bulb in the revolution counter, and two bulbs behind the panel serve to light the fuel gauge, ammeter, water temperature gauge and oil pressure gauge.

The bulbs are Lucas 987 12v. 2.2w.

The clock has its own bulb and the gear selector push buttons are illuminated by two bulbs.

The bulbs are Phillips 12829 12v. 2w.

The panel lights are controlled, in unison, by the rheostat control knob, marked 'P', on the dashboard and are wired in circuit with the side lamps.

In addition the speedometer and revolution counter have two bulbs each for the WARNING LIGHTS.

The bulbs are Lucas 987 12v. 2.2w.

Courtesy (Interior) Roof Lamp

Festoon Bulb 12v. 6w.

Door Shut Switch - Lucas Model 94 Part No.31175F.

This light is controlled by a switch in both front door pillars and the light comes on when a door is opened, and automatically switches off when the doors are closed.

A switch marked 'C' on the dashboard operates the light when the doors are closed.

Boot Lamp Lucas Model 474 Part No.052477
Bulb - Rival 12v. 6w.
Switch - Lucas Model 94 Part No.035436D

This lamp is mounted centrally beneath the tool compartments and is wired in circuit with the side lamps. A switch situated under the hinge on the R.H. side operates the light automatically when the boot door is opened and the side lamps are on.

Direction Indicator Flasher

Flasher Unit - Lucas Model FL.5. Part No.35020L.

The Flasher lamps are controlled by the indicator switch positioned on the left hand side of the steering column, the flasher unit being housed inside the car behind the dashboard.

When the indicator switch is in operation - UP for right turn, DOWN for left turn - a warning light AMBER embodied into the revolution counter will continue to flash until the lever automatically returns to its neutral position.

Glove Box Lamp Lucas Model L.550 Part No.52325B
Lucas Bulb 987 12v. 2.2w.

This light embodied into the top front of the glove box is operated by its own push button switch adjacent to the light. It is wired in circuit with the side lamps.

Radio

The radio installation is classed as an optional extra. The front speaker is situated in the roof over the dashboard and the second speaker is fitted into the rear squab shelf.

The balancing of the speakers is controlled by a rotary switch, to the right of the radio controls. By rotating the switch fully clockwise the rear speaker becomes non-operative, and similarly by rotating the switch fully anti-clockwise the front speaker becomes non-operative.

If a radio is not installed at the Works a dummy panel takes its place on the dashboard, the speaker grille in the roof and rear squab are fitted but not the speakers. The roof aerial is not fitted but the lead-in from the roof to the dashboard is in position.

ELECTRICAL SYSTEM - Type 408

This is a Lucas 12 volt system. Current is supplied by a large capacity air cooled generator in conjunction with a voltage and current regulator with automatic cut-out and a 12 volt 72 ampere battery.

BATTERY, Lucas BT.11A 4016437

The battery is housed in the offside wing bay.

Always keep the top of the battery clean and dry. 'Topping up' the battery is a routine matter and means that the plates in the battery should always be just covered by adding distilled water to the cells by removing the filler plugs. Various commercial appliances and methods are used for this procedure, but it is important not to overfill. Never use a naked light to examine the levels as the gas given out is inflammable.

No particular period can be given for the 'topping up' of the battery as hot weather and the conditions of use of the car must be taken into consideration. It is better to examine the levels frequently.

See that the battery is level and firmly clamped into position. The positive and negative connections are of different sizes and it is not normally possible to incorrectly attach them. Keep the battery connections clean, and smear the terminals with vaseline or petroleum jelly before attaching the leads, to prevent corrosion.

Trickle Charger Socket

An electric supply/feed socket is mounted on the right hand valance, in the engine bay, beneath the bonnet. Since it is in direct electrical contact with the battery, current may be drawn from the battery or supplied to it from a trickle charger.

The object of the trickle charger is to maintain the battery in a fully charged state when the car is not in use for lengthy periods, or when the output from the battery is too great for the running time to permit a fully maintained charge (e.g. short runs in winter months using lamps, starter etc.).

GENERATOR BRUSHES

Brushes should be examined at 10,000 miles, again at 20,000 miles, and at 5,000 miles thereafter.

Brushes that are worn short, or are covered with oil, should be replaced to prevent damage to armature, commutator and windings.

VOLTAGE AND CURRENT REGULATOR - Chrysler 1889944

FUSE BOX - LUCAS MODEL 4FJ. PART No. 033283L.

The voltage/current regulator and cut-out are housed in the right hand wing bay.

Two fuses are contained in the fuse block positioned immediately below the regulator. The positions of the fuses are clearly marked A1.A2. (Auxiliary fuse) and A3.A4. (Auxiliary ignition) and they protect certain accessories as follows:-

	Independent of the ignition switch	Controlled by the ignition switch
	Head, Side Tail, Boot and Number Plate Lamps. Headlamp Warning Light. Panel Lights. Ammeter. Horns. Radio. Clock.	Ignition and Ignition Warning Light. Selectaride Shock Absorbers.
Protected by A1,A2 Fuse 60 Amp.	Trickle Charger Socket. Cigar Lighter. Interior Light. Horns. Radio. Clock. Head- lamp Flasher.	
Protected by A3,A4 Fuse 35 Amp.		Stop Lamp. Petrol Gauge. Flasher Indic- ators. Blower Unit. Reverse Lamp. Petrol Reserve Warning Light. Windscreen Wiper Motor. Brake Fluid Warning Light. Manual Control Switch for Fans.

All accessories protected by a fuse will be inoperative if that fuse is blown.

CAUTION: Never replace a blown fuse with one of higher value, as this will only result in damage to accessories if a short circuit occurs.

The voltage/current regulator controls the output of the generator according to the load on the battery and its state of charge. When the battery is in a low state of charge the generator output is high, and this is shown on the ammeter.

WINDSCREEN WIPERS

WIPER ARM - Lucas Part No. 54711438

WIPER BLADE - Lucas Part No. 54711283

The windscreen wiper motor is mounted in the right hand wing bay. The cable transmits motion to the two wheel-boxes beneath the windscreen, which operate the wiper arms and blades.

No adjustment or lubrication is normally necessary as all parts are packed with lubricant on assembly.

The windscreen wiper control knob, marked WIPER, on the dashboard has three operating positions.

A thermostatic cut-out switch is built into the wiper motor to prevent over-heating. However, in order to avoid excessive load, the fast speed should only be used in heavy rain. Never use it in snow or on a drying windscreen without the use of the screenwash.

HORNS

High Note	...	...	...	...	...	Lucas WT.618	Part No. 69090
Low Note	...	...	...	...	...	Lucas WT.618	Part No. 69087

Dual Windtone horns are mounted behind the grille.

The push button in the centre of the steering wheel operates a solenoid relay switch Lucas 6.RA.Part No.33188A situated in the vicinity of the right hand horn.

The horns should give a long period of service without attention, but should they become unsatisfactory, check for any loose connections or loose attachment bolts before rejecting the horn itself.

LAMPS

Headlamps

Outer	7 inch dia. Lucas Model F700 MK.X. Part No.58618
	Light Unit. Lucas 7002 60/45W. Part No.54521060.
Inner	5½ dia. Lucas Model 5½ dia. 1A Part No.58990.
	Light Unit. Lucas Part No.54520172.

These are sealed beam units and in the event of a lamp failure the complete light unit must be changed. A high beam warning light - RED - is incorporated into the speedometer. When the foot operated headlamp DIPPER SWITCH, is depressed, it alternatively switches the outer headlamp light from the lower power filament to the higher power filament, the inner lamps come into operation and the RED warning light is ON. In the dipped position the inner lamps are out, the outer lamps are on the lower power filament, and the warning light is OUT.

Fog Lamp.)	Lamps optional. Switches provided on dashboard.
Spot Light.)	

Front Side Lamp	Lucas Model 584 R.H. Part No.52506.
& Flasher	L.H. Part No.52507.
(Clear).	Lucas Bulb No.222 (Side)
	Lucas Bulb No.382 (Flasher).

Rear Lamp	Lucas Model L684 Part No.53283.
Cluster. (Stop,	Lucas Bulb No.380 (Stop & Tail).
Tail & Flasher).	Lucas Bulb No.382 (Flasher).

Reverse Lamp	Lucas Model 595 Part No.52567.
	Lucas Bulb No.382.

Rear Number	Lucas Model 534. Part No.53518.
Plate Lamp.	Osram Bulb. 12v. 4w.

Instrument Panel Illumination

The instruments are illuminated as follows:- one bulb in the speedometer, one bulb in the revolution counter, and two bulbs behind the panel serve to light the fuel gauge, ammeter, water temperature gauge and oil pressure gauge.

The bulbs are Lucas 987 12v. 2.2w.

The clock has its own bulb and the gear selector push buttons are illuminated by two bulbs.

The bulbs are Phillips 12829 12v. 2w.

The panel lights are controlled, in unison, by the rheostat control knob, marked 'P', on the dashboard and are wired in circuit with the side lamps.

In addition the speedometer and revolution counter have two bulbs each for the WARNING LIGHTS.

The bulbs are Lucas 987 12v. 2.2w.

Courtesy (Interior) Roof Lamp

Festoon Bulb 12v. 6w.

Door Shut Switch - Lucas Model 94 Part No.31175F.

This light is controlled by a switch in both front door pillars and the light comes on when a door is opened, and automatically switches off when the doors are closed.

A switch marked 'C' on the dashboard operates the light when the doors are closed.

Boot Lamp Lucas Model 474 Part No.052477
Bulb - Rival 12v.6w.
Switch - Lucas Model 94 Part No.035436D

The lamp is mounted centrally beneath the tool compartments and is wired in circuit with the side lamps. A switch situated under the hinge on the R.H. side operates the light automatically when the boot door is opened and the side lamps are on.

Direction Indicator & Headlamp Flasher

Flasher Unit - Lucas Model FL.5. Part No.35020L.

The Flasher lamps are controlled by the indicator switch positioned on the left hand side of the steering column, the flasher unit being housed inside the car behind the dashboard.

When the indicator switch is in operation - UP for right turn, DOWN for left turn - a warning light AMBER embodied into the revolution counter will continue to flash until the lever automatically returns to its neutral position. A fore and aft movement of the lever will flash all four headlamps.

Glove Box Lamp Lucas Model L.550 Part No.52325B
Lucas Bulb 987 12v. 2.2w.

This light embodied into the top front of the glove box is operated by its own push button switch adjacent to the light. It is wired in circuit with the side lamps.

Radio

The radio installation is classed as an optional extra. The front speaker is situated in the roof over the dashboard and the second speaker is fitted into the rear squab shelf.

The balancing of the speakers is controlled by a rotary switch, to the right of the radio controls. By rotating the switch fully clockwise the rear speaker becomes non-operative, and similarly by rotating the switch fully anti-clockwise the front speaker becomes non-operative.

If a radio is not installed at the Works a dummy panel takes its place on the dashboard, the speaker grille in the roof and rear squab are fitted but not the speakers.

MAINTENANCE CHART

MAINTENANCE AND SERVICING

	1000	2000	4000	5000	6000	8000	10000	12000	14000	15000	16000	18000	20000	22000	24000	25000	26000	28000	30000	
CHANGE ENGINE OIL	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN AND ADJUST SPARK PLUGS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN AND ADJUST DISTRIBUTOR POINTS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK AND ADJUST BELT TENSION	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK FOR OIL AND WATER LEAKS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
WASH OIL FILLER CAP	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AUTOMATIC TRANSMISSION MAINTENANCE SERVICE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK LEVEL OF TRANSMISSION FLUID	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
REAR AXLE OIL CHECK	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BRAKE PEDAL - CHECK AND ADJUST	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STEERING BOX - CHECK OIL LEVEL	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE OIL FILTER ELEMENT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
DISTRIBUTOR CUP LUBRICATION	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GENERATOR CUP (2) LUBRICATION	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
MANIFOLD HEAT CONTROL VALVE APPLY SOLVENT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
ADJUST HANDBRAKE PADS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TOP UP SCREEN WASHER JAR	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE ROUND ROAD WHEELS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK BRAKE FLUID LEVEL INDICATOR	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN AIR FILTER	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK CONDITION OF SPARK PLUG LEADS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN AND GREASE BATTERY TERMINALS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK TIGHTNESS OF PROPELLER SHAFT BOLTS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
REAR AXLE OIL CHANGE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GREASE REAR HUBS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GREASE HANDBRAKE CABLE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GREASE HANDBRAKE COMPENSATOR	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TELESCOPIC SHOCK ABSORBER - CHECK FUNCTIONING	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
INSPECT BRAKE PADS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LUBRICATE PETROL FILLER MECHANISM	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LUBRICATE DOOR LOCKS AND HINGES	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK AND ADJUST TAPPETS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK COMPRESSION	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN CARBURETTORS AND JETS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK CARBURETTOR SETTINGS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN ENGINE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK FRONT AND REAR ENGINE MOUNTINGS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK AND ADJUST ENGINE CONTROLS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
LUBRICATE DISTRIBUTOR WICK	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE FUEL FILTER ELEMENT UNIT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE TRANSMISSION FLUID AND FILTER	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
FRONT HUBS - CLEAN AND RE-PACK	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
GREASE PROPELLOR SHAFT - FRONT AND REAR JOINT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
STEERING BOX - ADJUST IF NECESSARY	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TOE-IN - CHECK AND ADJUST	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
TEST HEAD, SIDE AND TAIL LAMPS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK PANEL LIGHTS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN SEAT RUNNERS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK CONDITION OF WIPER BLADES	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK CABLE CONNECTORS AND LOOM	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK REAR AXLE ALIGNMENT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK CONDITION OF ALL BRAKE PIPES	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AND CONNECTIONS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK TORSION BAR HEIGHTS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE AIR FILTER ELEMENT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK EXHAUST MOUNTINGS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CLEAN ALTERNATOR	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK RUBBER BOOT ON PROP. SHAFT	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK RUBBER SEALS ON STEERING	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
AND SUSPENSION JOINTS	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
INSPECT BREATHER VALVE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHANGE BREATHER VALVE	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
CHECK BRAKE VACUUM HOSE AND AIR FILTER	•	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

BATTERY Check level and top up if necessary
RADIATOR Check level and top up if necessary
TYRES Check pressures and wear
ENGINE Check oil level
TRANSMISSION Check oil level

WEEKLY

PERIODICALLY

Check disc brake friction pads for wear - $\frac{1}{4}$ inch minimum permissible.
 Check valve in radiator cap for freedom.
 Inspect water system hoses for condition.
 Check water system joints for leakage.
 Check and rectify oil leaks.
 Check battery for condition.
 At 10,000 mile intervals, or every 6 months, whichever occurs first, check the condition of the brake vacuum hoses and the servo air filter.

NOTE. Checking Front Suspension and Steering Joints

The rubber seals on all suspension and steering joints should be checked at intervals of 10,000 miles to ensure that the seals are intact and waterproof. A damaged seal, if neglected, can lead to rapid wear of the joint.

Whilst examining the condition of the seals a check should be made to ensure that the ingress of dirt or water has not caused wear, particularly at the top and bottom joints of the stub axle carrier.

This can be best be done by jacking up each front wheel in turn under its spring pan, using a box suitably placed under the diagonally opposite rear corner of the chassis frame to react against the weight transfer and allow the front wheel to lift free from the floor.

With the main spring load removed from the lower suspension joint and with the wheel removed, the stub axle assembly can be shaken to determine if slackness is present.

Should the check indicate slackness at either top or bottom joint, a strip examination of the suspect joint should be made to determine its condition.

HEATER - VENTILATING SYSTEM

This built in system is controlled by two rotating control knobs on the dashboard, with a blower switch positioned centrally between them.

Air enters the heater through the grille, rear of the bonnet, and below the windscreen.

The various positions of the rotary knobs are given below and they can be used as follows:-

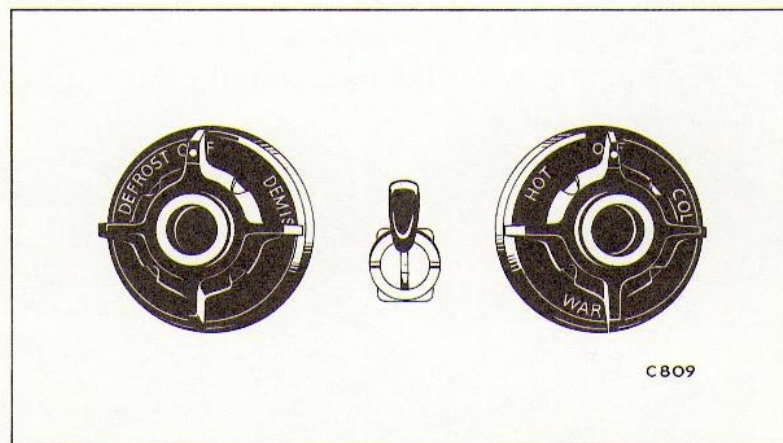


Fig. 6 Heater Controls

HEAT and VENTILATION CONTROL KNOB

From OFF position, turn clockwise progressively to COLD, WARM and HOT.

WINDSCREEN DE-MIST CONTROL

From OFF position, turn clockwise progressively to DEMIST AND DE-FROST.

BLOWER SWITCH

UP...	...	...	...	...	...	...	...	...	OFF position.
HORIZONTAL	...	...	...	...	...	...	...	...	BLOWER HALF SPEED
DOWN	...	...	...	...	...	...	...	...	BLOWER FULL SPEED

Thus, the system can be used normally, with the blower switch OFF, boosted to a second stage with the blower switch horizontal, and boosted further to a third stage with the blower switch down.

COLD AIR SUPPLY

A lever situated centrally below the dashboard controls the supply of cold fresh air into the car. This is a direct air stream which enters the car at the grille just forward of the windscreen. It is completely independent of the heater system and blower.

Any position from shut, lever fully LEFT, to open, lever fully RIGHT, can be used depending on the flow of air required.

The use of the opening rear quarter lights in conjunction with the heater and ventilating system is recommended, wherever possible, for air circulation.